48120

Is this the Ultimate Sailplane?—FALCON 880

October 1990

MODEL AIRPLANE NEWS

THE WORLD'S PREMIER R/C MODELING MAGAZINE

DARE TO TAKE THE PLUNGE

FLOATPLANE SPECIAL

WEIRD SCIENCE!

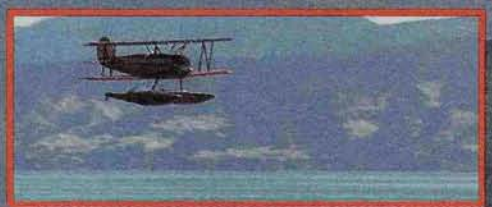
Heli-Vector

SCHNEIDER TROPHY RACERS—Nostalgia!

CLEARLAKE '90

CONSTRUCTION:

Build the Beautiful Bellanca P-200-A



Documentation Sources for Scale Floats

BEAUTY & THE BEAST —OUR VERSION!

- Scale Amphibian Canadair
- Sport Seaplane Flying Wing

USA $2.95 Canada $3.75

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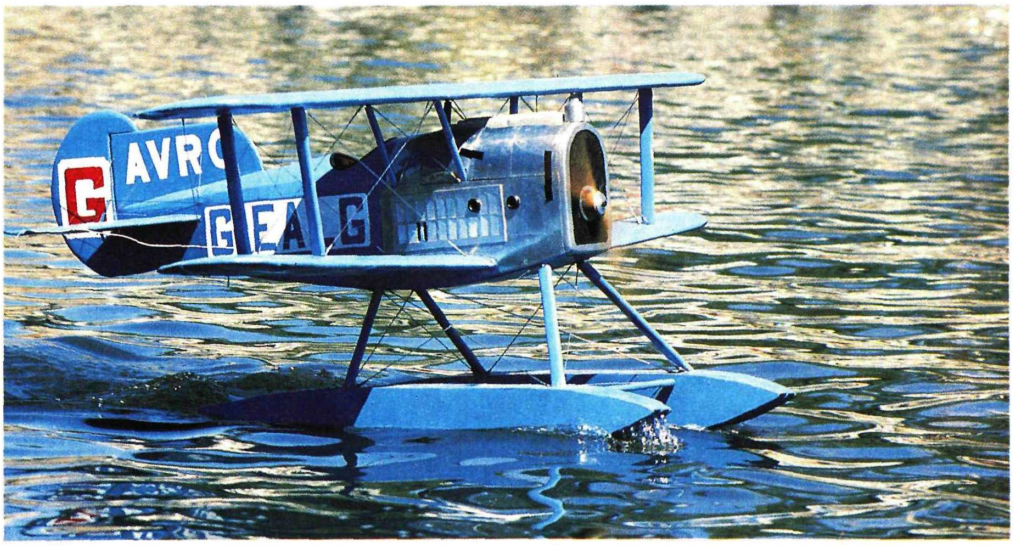
OCTOBER 1990 VOLUME 118, NUMBER 10

MODEL AIRPLANE NEWS



ON THE COVER: Main photo—Richard Moore's scratch-built, 0.S. 160 twin-powered Lazy Ace on the wing at Clearlake '90. Bart Van Syoc's Quadra 50-powered Great Lakes Trainer and two other impressive floatplanes—the Beauty and the Beast—are inset at the bottom (see others inside!). With contents ranging from the strange (Heli-Vector—middle inset) to the beautiful (Bellanca P-200-A construction) to the sublime (Falcon 880—top inset) this issue is guaranteed to keep your interest!

FEATURES

HELICOPTER SECTION

MINI CONSTRUCTION

COLUMNS

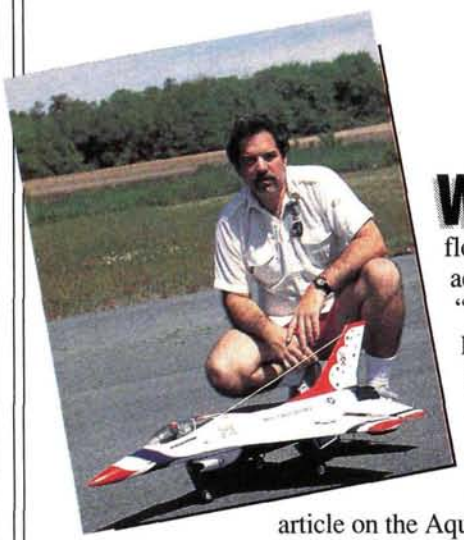
COLUMNS

DEPARTMENTS

Model Airplane News (ISSN 0026-7295) is published monthly by **Air Age, Inc.** ,251 Danbury Rd., Wilton, CT 06897. Second-class postage paid at Wilton, CT, and at additional mailing offices. Subscription rates are: $24.95 for 1 year (foreign, $34.95); $45.95 for 2 years (foreign $65.95). **Postmaster:** send Form 3597 to **Model Airplane News,** P.O. Box 428, Mount Morris, IL 61054.

EDITORIAL

by RICH URAVITCH



SEAPLANES AND SAYONARA

WELL, HERE IT IS AGAIN, float fliers—our third annual floatplane issue, or, more accurately, seaplane issue. This "theme" issue was a lot of fun to put together and has been in the planning stages for some time. In fact, the plan went so well that I had too much material, so some of it will be presented in future issues. The construction article on the Aquastar (by aquatic ace, Laddie Mikalasko) and a Field & Bench Review by Dick Purdy on the Ace Seamaster 120 will both be coming along fairly soon—and you won't have to wait till next year!

As was the case with our previous two floatplane "specials," much of the credit for the material you'll find between these covers goes to "Mr. Floating Around," John Sullivan. John has found his R/C niche with seaplanes, and he directs nearly all his modeling energies towards it. John is typical of *Model Airplane News* contributors: he's good at what he does and is willing to share whatever he discovers with others whose interests lie along the same path.

Those who prepare the material that you enjoy are all like that. Randy, Joe, Craig, Dick, John, Pappy, Mike and all the others make this job great, and that brings me to the second part of the title of this Editorial. This is my last issue as editor-in-chief of *Model Airplane News*. (It's coincidental that I started here with the floatplane issue three years ago.)

It has been an exciting and challenging time for me. I leave with the satisfaction of knowing I accomplished a number of my goals, and I'll still be doing projects for the magazine.

If we've provided you with a publication that you've found interesting, entertaining and informative, we've done our job. I'm looking forward to meeting all of you somewhere down the runway, and I leave you in the capable hands of the new editor, Tom Atwood.

Rich Uravitch

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AIRWAVES

WHERE TO WRITE TO US If you're writing to the editors (and we'd love to hear from you), please be sure to address your letters to "Airwaves" *Model Airplane News*, 251 Danbury Road, Wilton, CT 06897. Only subscription orders and inquiries are handled by our Customer Service Department in Mount Morris, IL; other mail addressed there must be forwarded to Connecticut, and this leads to long delays.

ALERT TO READERS: Build a Dual-Rate Ni-Cd Charger CAUTION

Some of our more technically inclined readers have pointed out that the September article on how to build a dual-rate Ni-Cd charger presents a potentially hazardous electrical design. Failure to use a polarized plug could result in a dangerous 120V charge at the charger terminals. Peter Carr (author of the article) advises that, if you build this charger, you *must* take the following precautions:

- **Use a polarized plug.**
- **Check to ensure that the ground line is connected to neutral.**
- **Install a one-to-one (isolation) transformer on the input AC line for added protection.**
- **Do *not* use this or other 120V, AC equipment near water.**
- **Check the batteries for excessive heating (unrelated to the electrical hazard, but important nonetheless!).**
- **It's advisable to move the fuse to the hot line.**

Thank you to Steve Mottin of Watauga, TX, and Jack Owens of St. Louis, MO, for first bringing this to our attention!

Electrical Correction

I'd like to correct a couple of errors in my August '90 article, "Crash Course in Electric Hobby Motors."

In Figure 4, a small, black line showing the battery-positive terminal connected to the motor-positive terminal shouldn't be there. The current must flow through the meter or the meter will read "zero."

Also, the last paragraph in the second column (same page) starts, "Alternatively, if you use a smaller prop or an efficient speed controller, the motor will go more slowly...." It should read, "Alternatively, if you use a smaller prop or an efficient speed controller, you'll go more slowly...." The plane will go more slowly with a smaller prop, but the motor will obviously speed up.

Since *MAN* is an international magazine, I also think it's fair to point out that tach calibration is different in countries (like Britain) with 50Hz electric power. In those countries, pointing the tach at a fluorescent light will yield 3,000rpm in two-blade mode and 2,000rpm in three-blade mode, if the tach is correct.

If *MAN's* readers have any comments/questions, they can write to me.

BOB SCOTT
911 East 21st St.
North Vancouver, B.C.
Canada V7J 1P1.

Bird-Dogging the Bird Dog

I'm interested in building a model of the Cessna L-19 Bird-Dog (preferably from a kit) for R/C flying. The only such kit I've seen was offered by Circus Hobbies and, as you know, that organization has discontinued sales to the public.

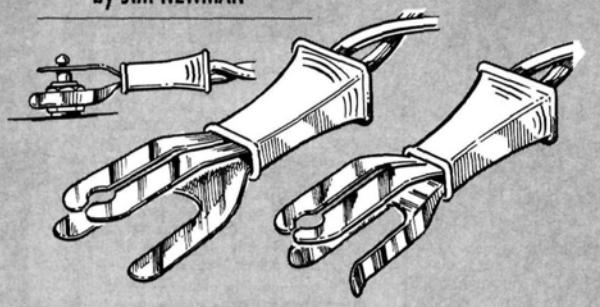
Do you know who took over Circus Hobbies' retail business? If not, do you know who manufactured this kit? (As I recall, it was 1/5 scale with operating flaps.)

FRANCIS K. MAINZER, MD
Erie, PA

HINTS & KINKS

Model Airplane News will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Hints & Kinks." Send a rough sketch to Jim Newman, c/o **Model Airplane News**, 251 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

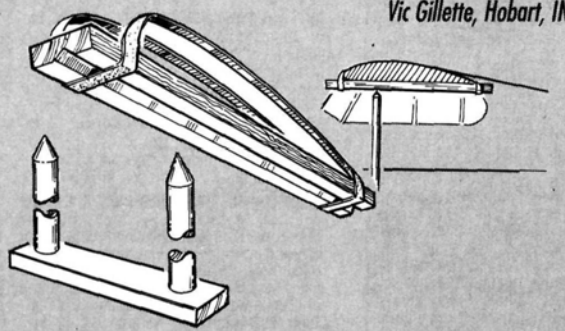
by JIM NEWMAN



COX GLOW-CLIP ADAPTION

This simple modification will allow you to use a Cox glow-plug clip on regular Fox glow plugs. If you bend the sides of the clip downward, as shown, the lower grounding element will grip the hexagonal plug body nicely.

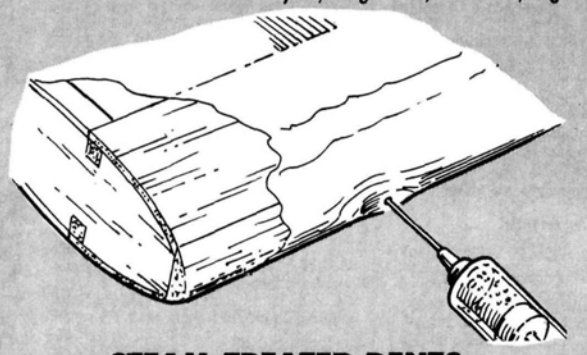
Vic Gillette, Hobart, IN



BALANCE-JIG WING PROTECTORS

When we try to balance a new model on pointed or chisel-end dowels, we invariably dent the wings. To protect them, attach these protective, grooved, wooden strips to their undersides with rubber bands.

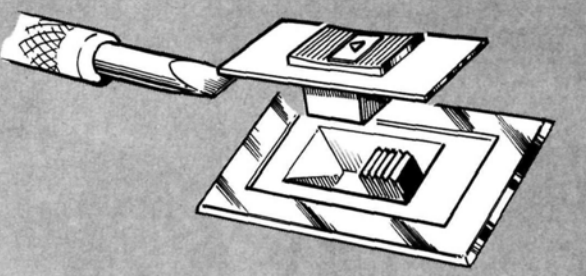
Dennis Bryant, Burgess Hill, W. Sussex, England



STEAM-TREATED DENTS

Trips into the weeds can make dents in your plane's balsa leading edges. If the dents aren't severe, you can eliminate them without stripping off the shrink-film covering. Use a fine hypodermic needle to inject water into the balsa, and heat the wood with an iron to steam out the dents. The small needle hole will disappear, too.

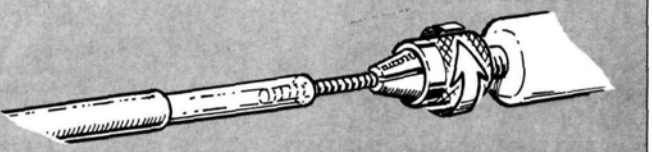
Dave Kovensky, Maryland Heights, MO



TRANSMITTER-SWITCH SAFETY MODIFICATION

Many good models have bitten the dust because their owners inadvertently turned off the transmitter switch while groping blindly for the trims. On Futaba radios, this problem can be eliminated by inserting a thin blade under the switch cover and popping it off; this leaves the switch recessed and out of harm's way. To keep out dirt, cut a thin, transparent-plastic cover and hinge it with tape. A member of the impound staff will be able to see through the cover to check the switch.

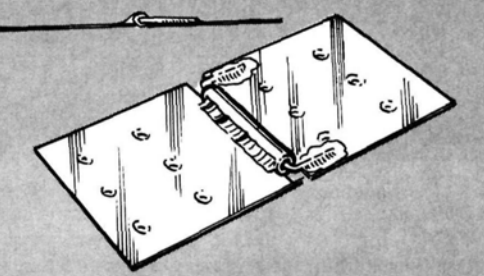
Tom Herr, Portage, IN



PAINLESS THREADED-COUPLER INSERTION

Twisting a threaded rod into a plastic pushrod "inner" can be hard on your fingers, so try this alternative. Grip the rod gently in a drill chuck, run the drill and twist the rod into place. If you use a variable-speed electric drill, be sure to select the lowest speed.

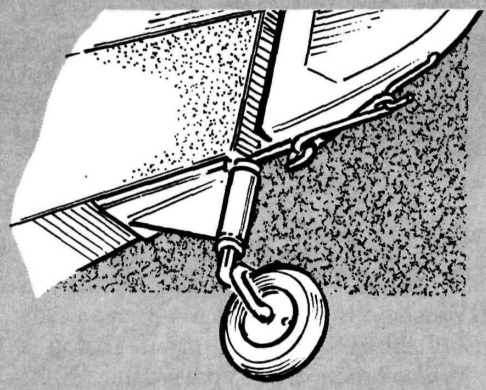
Peter Hessedal, Montrose, MN



ULTRA-THIN HINGE

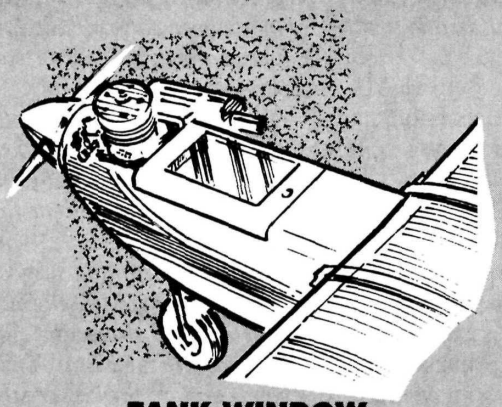
These hinge blades are cut from thin, tin-can stock, and the knuckle is made of brass tube soldered to 1/32-inch copper, brass, or paper-clip wire. Because they can be mounted right below the skin's surface, these thin, yet remarkably sturdy, hinges are ideal for scale-cowl or split-flap hinges. Use a sharp tool to punch bonding holes through the tinplate, or to countersink the miniature flat-head screws.

Gene Fierce, Spokane, WA



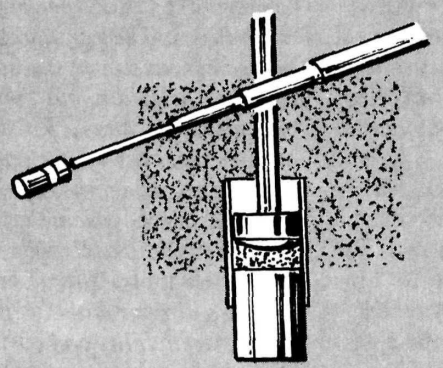
TAIL-WHEEL STEERING

This simple tail-wheel steering not only eliminates alignment problems and broken rudder hinges, but it also isolates servo gears from steering shocks. A lightly tensioned rubber band is all that's required, and you can position the tail wheel farther forward, if necessary.



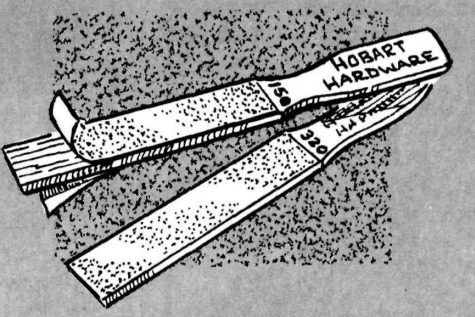
TANK WINDOW

Set flush in the top of the tank hatch, a plastic window allows you to check the contents and condition of the tank's plumbing—especially if the clunk line tends to "hang up" after sudden stops.



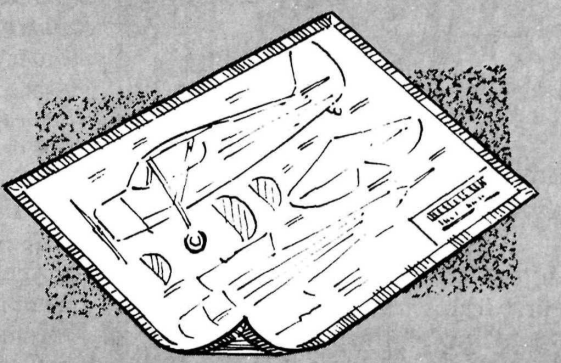
MAGNET STICK

Epoxy a small Radio Shack button magnet to the end of an old antenna, and you'll have a useful tool for retrieving dropped screws, etc. To form a dam that will retain the resin while it cures, apply masking tape around the magnet. Note the gap between the magnet and the antenna; this prevents the assembly from becoming one long magnet.



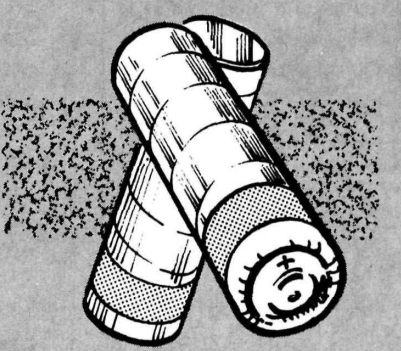
SANDPAPER FILES

Collect paint stirrers, and glue various grades of sandpaper to each side. Now you have a collection of useful sandpaper "files."



EDGE PROTECTOR

Masking tape folded around your plan's edges protects them from tearing. Some blueprint shops have a machine that will do this task for you quickly and inexpensively.



NI-CD POLARITY MARKERS

The polarity marks on some Ni-Cds are difficult to see. A stripe of red dope around the positive end provides unmistakable orientation—especially if your system must be removed for recharging.

AIRWAVES

(Continued from page 8)

Doc, most of the products sold by Circus Hobbies via mail order are now available from your local dealer or direct from Hobby Dynamics. Among these are the imported Marutaka kits (like the L-19 Bird Dog) from Japan. Our very own "Sporty Scale" columnist, Frank Tiano, reviewed this kit in our July 1982 issue. I remember thinking then that I'd like to build one, but Frank beat me to it!

RAU

More Kotula Kudos

A "tip of the hat" to Rick DeMeis, Air Age, and to you for the *excellent* feature article (and tribute to) about Jo Kotula! I know that I speak for many others by saying "thank you" for letting Jo's following know more about the man and his work.

JOHN ELLIOT
Cox Hobbies, Inc.
Santa Ana, CA

Big John, your comments are typical of the others that we've received on the Kotula piece. It was our pleasure to bring Rick's article to you all. Thanks.

RAU

Fledgling Flier

I've been reading *MAN* for a few years—I really enjoy it! I'm 13 years old and I have a Midwest Aero-Star 40 that my dad gave me. I really like the plane, and I already have the rudder, elevator, fuselage and one wing built. I'm building the 4-channel version.

Could you recommend an inexpensive, but good-quality .40-size, 2-stroke engine? Could you also recommend a 4-channel radio? I was thinking about getting a Futaba 4NBL Attack radio. Is this a good radio?

JOSHUA DAVIS
Auburn, CA

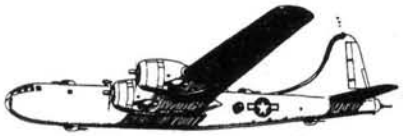
Josh, glad you enjoy MAN. We enjoy hearing from the new generation of modelers, like you, who have discovered the challenging world of aeromodeling.

Your dad is either a modeler himself, or he was given advice when he selected the Midwest AeroStar 40 for you. It's an excellent first airplane and will serve you well through your training stages.

There are many .40 engines (both imported and domestic) that are suited to your AeroStar. Two of the "home-grown" variety are the K&B Sportster and the Fox .40. These are excellent engines which, when properly cared for, can provide years of reliable service. Among the suitable imports are O.S., Super Tigre, Enya and Rossi. They're usually more expensive, and parts are sometimes difficult to obtain, but they're very popular with today's R/Cers.

The Futaba would be an excellent choice because of its reputation for service, but the axiom that "a radio is a good radio as long as it works" seems to apply. There isn't necessarily a direct relationship between quality/reliability and cost. I'd suggest, though, that you consider a 5-channel system rather than a 4-channel for your first radio. It's not that much more expensive and it gives you the additional channel when you're ready to "grow into it."

RAU



Behemoth Bomber Builders

Some of our customers are interested in building scale models of warbirds and have been looking for plans to build the B-29, the B-50, or the B-36. If you have these plans, or any information about where we can obtain them, we would surely appreciate your help. A 9-foot wing span is desirable.

DANIEL J. PEREIRA
DJ's Hobby Stuff
Prague, OK

Dan, many of our readers might be interested in the same things as your customers. To recap on the three bombers you mentioned: the only B-29 that might fit the bill (although larger than 9 feet) is produced by Byron Originals for its own "Striking Back" show. I don't think there are plans to make a kit available. Other B-29s/B-50s have appeared over the years, but there haven't been any drawings.

The B-36 has also been successfully modeled in R/C form as far back as 20 years ago, when two of them were at the Nats. No construction articles have ever appeared, but this isn't unusual. In projects of this magnitude, many of the models are built using the "cut-and-try" design method—the parts and patterns don't always reach the final sheet of paper...and then there's all the construction photography...and the drafting...and the manuscripts and.... Readers! If YOU know of any existing plans, please let US know!

RAU

"Prop-er" Help

Hi dudes! Thanks for a great magazine, and for bringing me into a great hobby. In December '89, I was at the newsstand, just to look, and I saw *MAN*. I bought it, and I was amazed over how good it was and, since then, I've been buying it. Too bad I have to pay 6 bucks for it! (I haven't subscribed yet, because when you're 14 years old, money doesn't grow on trees.)

I recently bought the plans for the Fantrainer, and let me tell you something: I didn't expect it to be so easy to build! I'm almost finished building, and I can't wait to get it into the air.

I have one big problem about props. If a prop is 5x3, how big is it? Is it 5 inches across, and what is the other number? Could you please help me!

THOMAS NIELSEN
Gimse, Norway

Hey dude, like, glad to have you aboard, man! I'm sure you'll find the Fantrainer totally awesome to fly. Like, the six-buck tariff would totally bum me out too, man, but shipping across the pond grabs outrageous dollars...time to plant the money tree, dude!

A 5x3 prop means that it has a 5-inch diameter and a 3-inch pitch, so, with each complete revolution, the blade will advance 3 inches. Knock off a couple of percent for drag, wasted energy, torque-induced blade twist and other efficiency-attacking factors, and your 5x3 will perform like a 5x2 1/2 in the real world—unless, of course, the manufacturer has already taken these factors into account. Isn't science totally gnarly, dude?

RAU

We welcome your comments and suggestions. Letters should be addressed to "Airwaves," **Model Airplane News,** 251 Danbury Road, Wilton, CT 06897. Letters may be edited for clarity and brevity. We regret that, owing to the tremendous numbers of letters we receive, we cannot respond to every one.

HOW TO:

by RANDY RANDOLPH

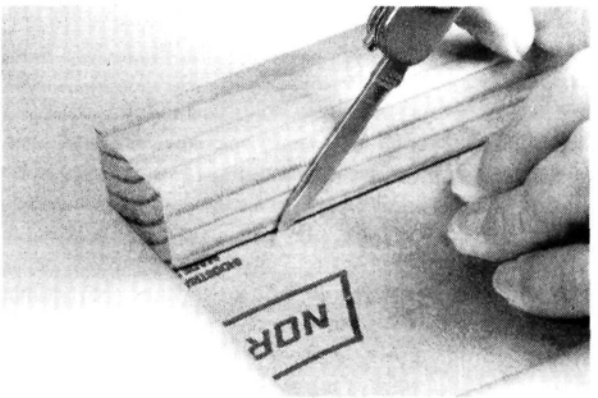
THE GLUE STICK

The glue stick is a relatively new addition to the growing number of adhesives, and it's becoming very popular. The photos show two ways in which it can benefit modelers. How many more can you think of?

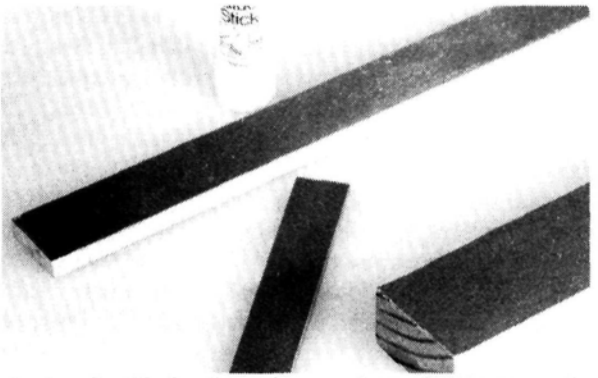
1. *First popular as a paste-up tool for artists, the glue stick is a dry substitute for white glue or paste, and it doesn't distort paper when first applied. Its texture is similar to that of a candle, and it's water soluble.*

3. *Rub the glue stick over the non-abrasive side of the sandpaper, and cover the edges well. Position the paper on the block and press into place. (Aluminum-oxide paper is the best for model use.)*

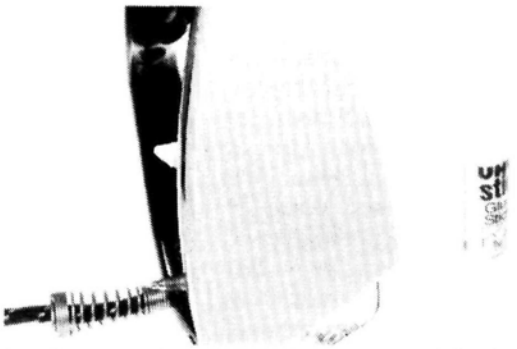
5. *The glue stick is ideal for attaching a sock to the bottom of an iron when you're working with plastic films. Cut a piece of 100-percent cotton material to fit the plate of the iron, and allow a 1/4-inch overlap around the edge. Apply the glue stick to the side of the sole plate and smooth-on the sock.*



2. *Sanding blocks are one of the most useful tools in the shop, and the glue stick is perfect for gluing the sandpaper to the block. Trim the sandpaper to the exact shape of the block by cutting it from the non-abrasive side.*



4. *Sanding blocks of any shape can be made this way, and a different grit of sandpaper can be glued on each side. To replace the paper, just peel it off, and remove the glue with a wet paper towel.*



6. *The material overlaps at the corners and the tip, so add more glue where needed. When the sock is removed, or replaced, the glue can be washed off the iron with water. Remember: to compensate for the insulating qualities of the cloth sock, make the iron slightly hotter.*

PILOT PROJECTS

A LOOK AT WHAT OUR READERS ARE DOING!

$END IN YOUR SNAPSHOT$!

MAN is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable.

All photos used in this section will be eligible for a grand prize of $500, to be awarded at the end of 1990. The winner will be chosen from all entries published, so get a photo or two together, plus a brief description and send it in!

Send those pictures to: Pilot Projects, Model Airplane News, 251 Danbury Rd., Wilton, CT 06897.

CLASSY CUB

Looking about as real as it can get, this scratch-built, 1/5-scale Super Cub is the handiwork of Harry Newman (Hooksett, NH). ROW capabilities are provided by the Goldberg floats, and the power to get it on the step and airborne comes from an ST .61. This 10 1/2-pound beauty uses a World Expert radio. It took first place in Static at Sebago Lake, ME, this May, and we can understand why!

HERE'S LOOKIN' AT YOU, KID!

Here's an R/C motorcycle driver who decided to get airborne! Dave Herbert (San Juan Capistrano, CA) pirated the driver from a Kyosho motorcycle and put "him" into the cockpit of his Kyosho Concept, which is fitted with a Hughes 300 bubble body. Not content to look straight ahead, "HAL-9000" (as this heli flier is called) is "siliconed" to the tail-rotor servo wheel, and this allows him to "rubberneck" through the turns.

SUPER SLICK SEAMASTER

Randy Gunderson (Michigan, ND) tells us he has only been in the hobby for three years, but has been reading *MAN* during that time. He says there are a "few" R/Cers in North Dakota, but he doesn't see much of them. Neither do we! Come on, North Dakota!! Randy's Ace Seamaster 40 is powered by a Fox .50 and covered with Coverite Black Baron film. Randy took the photo in his swimming pool because "It's hard to find open water in ND in February!" We agree Randy, but your fellow ND R/Cers should be out in force by now!

HE'S A TRAVELIN' MAN

This unique Sikorsky S-39 amphibian was scratch-built by W.R. Helverson (Sparks, NV). He's retired and is a "full-time" RVer (as well as R/Cer) who spends his time traversing the country, building and flying. His S-39 is Wankel powered and has a 5-foot wing, which doesn't seem particularly outsize, until you consider that, like all W.R.'s recent modeling efforts, it was built in his motor home. He mentions that things became a little "cramped" inside, so he added a 4x10x2.5-foot "hangar" to the roof. Great idea!—a self-contained, totally mobile air force!

WATERBORNE WACO

Jess Larsen (Mendota Heights, MN) built this Waco from the 1/5-scale Pica kit. It's powered by an O.S. 120 4-stroker equipped with a C&H electronic ignition. Jess seems to be from the "old school" of modeling (he signed his letter "Retired Senior Citizen"). We figured that out when he said his Waco is "covered with silk and finished with butyrate dope." It sure is nice to see this kind of modeling artistry. He says his Waco is a "great" flier, but the floats increase weight and drag and that taxes the O.S. Incidentally, you're looking at a rebuilt model. The original had a mind of its own and, on its third flight, it hit the ground! Great rebuilding job!

THE ITALIAN CONCEPT

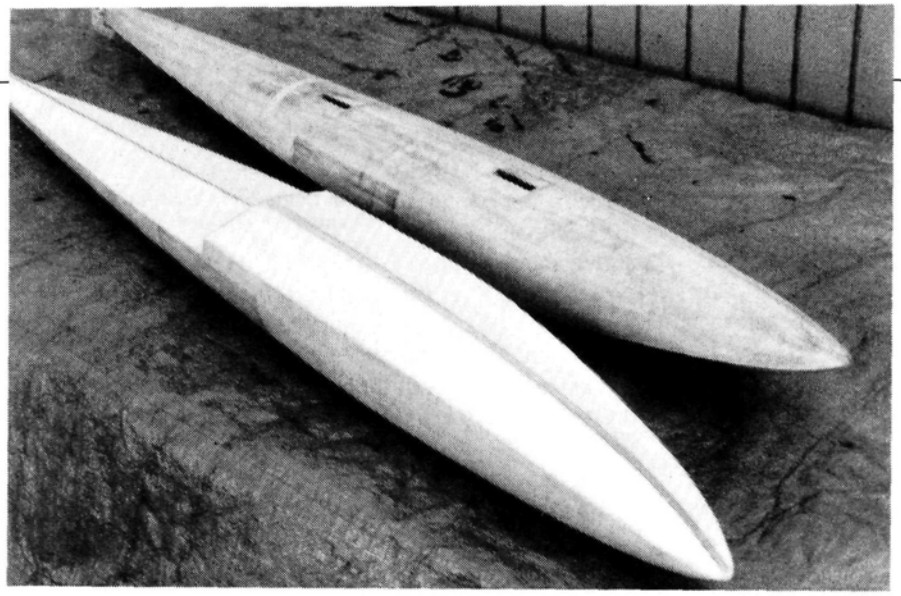
Having no prepared runways to fly from didn't dampen the enthusiasm of Sgt. Robert Prestridge (Comiso A.S., Italy). His collection of R/C machinery qualifies him as having the largest "air force" on the base. After only a month with his Kyosho Concept 30, he's already moved from hovering to forward flight, and he feels comfortable with it. His concept is powered by an O.S. .28 and uses a JR radio with a Futaba gyro. The slick paint job comes right out of Testors' spray cans, and the color is protected by multiple clear topcoats.

GORGEOUS GOONEY BIRD

Folsoms Air Service is where David Hall (Greenville, ME) works, and one of their projects is the installation of a set of Edo floats on a full-size DC-3/C-47. Not to be outdone, and certainly keeping down the costs of operation, Dave built this 12-foot C-47 from Ziroli plans and mounted it on scale Edos he produced from their drawings. A pair of Zenoah G-38s provide more than enough power for the magnificent machine. Under the guidance of a Futaba 1024PCM radio, the 51-pound C-47 has made six flights so far, and the log book is regularly receiving new entries. Beautiful job, David!

FIBERGLASSING FOAM FLOATS

by JOHN SULLIVAN



Completed Savoia floats ready for mounting and prime coat. Tops are covered with 5-ounce Kevlar, while the bottoms received 6-ounce glass-cloth. Finishing epoxy resin is applied directly to foam.

ONE SURE-FIRE METHOD of constructing floats is to apply fiberglass cloth directly onto a foam core using epoxy finishing resin. This method has the best strength-to-weight ratio; it's puncture-proof; and it has no interior voids. Glassed floats seem to offer the best of everything—including the quickest path from the bench to the lake!—yet many float fliers shy away from using this method because they're unfamiliar with the glassing process.

MATERIALS

• *Polystyrene foam:* The best polystyrene foam I've found is cast from BASF 322 virgin small bead with a vacuum-assist that eliminates internal stressing in the finished product. This small-bead foam is available from plastic suppliers in big cities, or you can buy slabs with larger beads (used for insulation) from a building supply yard. The polystyrenes used in construction are usually sold in standard and utility grades, and they contain recycled foam or large beads. They'll work for floats, but they react differently to sanding, and it's more difficult to get a smooth, uniform surface.

Making a natural flotation medium even better for our models

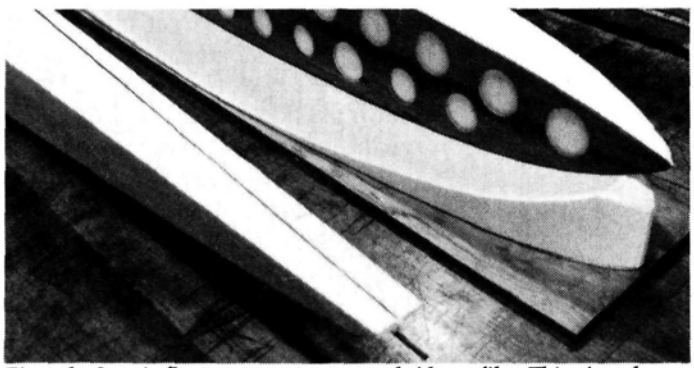
• *Fiberglass cloth:* I recommend 6-ounce fiberglass cloth. You can buy the "heavyweight" cloth from Sig*, K&B*, or PEC's*, or a package of "Bondo," which is available from hardware and auto-supply stores. At first glance, the heavy cloth seems to be *too* heavy, but if you cut a sample strip off a finished float, it would be almost as thick as 1/64-inch ply and have superior tensile strength.

• *Finishing epoxy:* I prefer West System's* finishing epoxy. Many companies use fillers in their epoxy formulas to provide users with easy-to-measure ratios of 3:1, 2:1, or 1:1. For superior strength and resilience, West Epoxy mixes its epoxy at a ratio of 5:1, and it supplies an automatic metered pump to ensure the correct mixing ratio. You can use epoxies that have lower ratios, but thin them with alcohol until they're the consistency of a high-quality varnish.

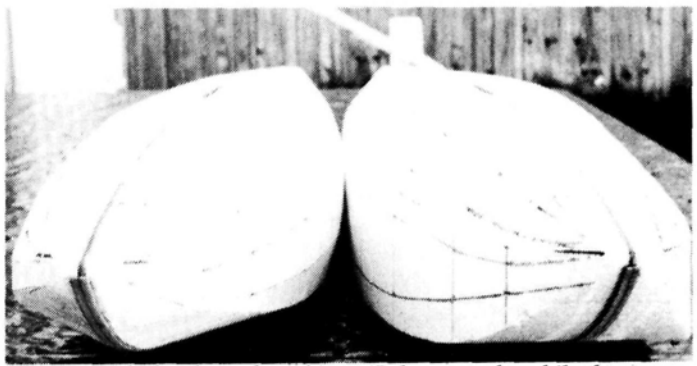
SAMPLE FLOATS

The floats shown are for the Savoia-Marchetti that Mike Johnson and I are building for the 1990 Schneider Race. They have a more complicated shape and component makeup than most sport floats, so I suggest that you disregard the "extras" in these instructions if a sport float is all you're after. We used the Savoia float for this article to give readers an overview that will help them deal with special situations; we included a float-proportion-and-layout plan to help those of you who cut your own floats. This plan was first published in the September '87 float issue of *MAN*, and hundreds of readers have written to express their satisfaction with the design.

(Continued on page 20)

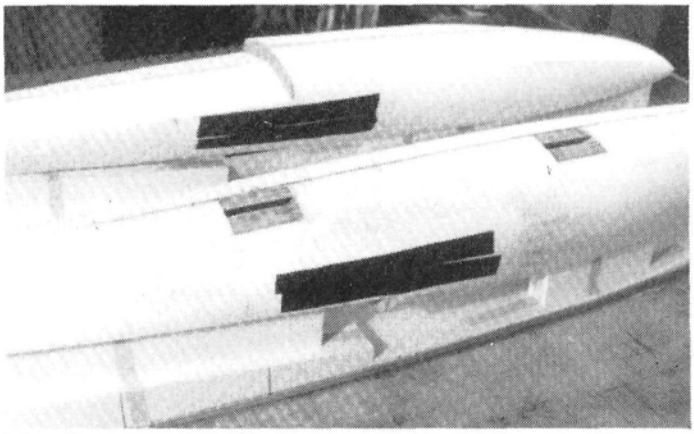


First, the Savoia floats were cut to top and side profiles. This view shows center web ready for lamination. Note rudder pushrod sheath embedded in half-core stern section.



Float on right has been shaped to a 45-degree angle, while the one on left has final 22 1/2-degree tangents cut in. Note 1/64-inch-ply keel plates glued into place.

FOAM FLOATS



These floats have been finished to shape. Note .003 carbon-fiber reinforcement and redwood landing-gear blocks.

FLOAT PREPARATION

Preparation of a foam float for glassing usually involves the installation of hard-point, or "strong-back," material (to take abuse where it's encountered most), a light sanding, and vacuuming to remove loose material. Hard-point material usually consists of a deck plate to accept landing-gear screws, a stern plate on which to mount a rudder, and a stiffener on the step's vertical wall (to reinforce that area and to prevent the step from being distorted or crushed when you lay the floatplane down on a rocky beach or a workbench full of tools).

For the deck plates, 3/8-inch material is sufficient, and 1/8-inch ply will work for the stern and step. Never round the edges at the bottom of the float or in the step and stern area, as this will dramatically reduce the float's efficiency—much like curving the sharp edges of snow skis.

What about reinforcing the float longitudinally? In a usual sport float that's up to 48 inches long, the 6-ounce cloth will provide all the strength you'll need for normal service. The Savoia floats, however, are 5 to 7 1/2 feet long, will support a total aircraft weight of 30 pounds, and will probably take a pounding at Havasu. To prevent failures when venturing into the unknown, I used three reinforcement methods.

After making two primary cuts for the top and side profiles, I split the Savoia float down the middle. Then, I drilled the 1/8-inch mahogany ply templates (which were used for hot-wiring the side profile) to lighten them, and I sandwiched them between the float halves to provide a full-length, full-depth web reinforcement.

I epoxied two, 1x10x.003-inch, carbon-fiber ribbons to each float side just above the step and cutaway juncture. I then glassed the entire top and the sides with 5-ounce Kevlar, which is at least three times as strong as 6-ounce glass-cloth. If these floats break, it won't matter, because the plane will be impossible to identify!

It's important to keep sport floats light and maintain a balance between strength and weight. Reinforcing the side step area with carbon fiber or a strip of 1/64-inch ply is probably the strongest, lightest and most effective method available to modelers. Installing a full web for reinforcement will practically turn the float into an I-beam when glassed, so, if you use this method, consider using 2-ounce (medium) cloth for covering to make up for the weight of the web.

CUTTING QUANDARY

Even if you don't own hot-wire-cutting equipment, you can still use foam floats. Several ready-cut foam float cores are available through hobby distributors, and polystyrene foam can be machined and shaped easily with band saws, table saws, hand-held hacksaw blades, Surform® tools, sanding blocks, etc.

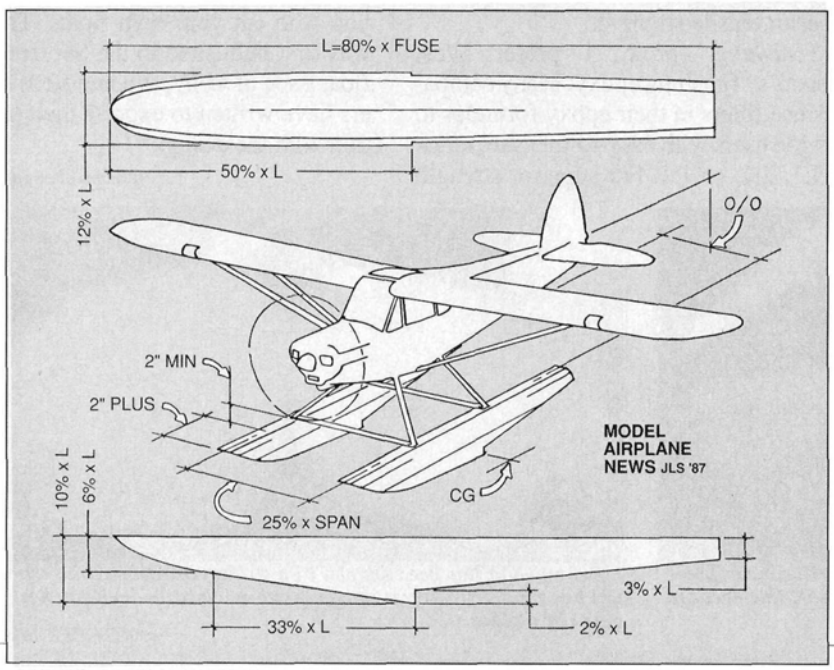
While shaping the Savoia floats, I made a surprising discovery. To round the floats from their hot-wired, two-dimensional shape, I had to cut successive facets along their full length. I went to the kitchen and came back with an arsenal of butcher knives. To my surprise, the oldest one, which is about 11 inches long and 1 inch deep and *not* hollow-ground, cut the foam smoothly and without tearing out beads. Apparently, a hollow-ground blade makes an entry cut that's too fine to allow the shank to pass through the foam, while a thin, uniformly sided blade slices through accurately and almost effortlessly. With practice, I was able to shave off wafers of foam that were so thin you could see the knife blade *through* them!

GETTING STARTED

Before glassing, collect the following tools and materials: glass-cloth, epoxy, a tape measure, a marking pen, scissors, a straightedge, spatulas or squeegees, filler, brushes, mixing cups, newspaper, rags and acetone for cleanup. It's best to glass the float's top and sides in one operation, and do the bottoms after the tops have cured. To begin, put the floats up on blocks on your workbench so that the excess cloth hangs freely past the float sides. Measure and cut the glass-cloth leaving extra all around, and draw a line down the center. Next draw a center line down the float top, and roll up the cloth on the longitudinal axis.

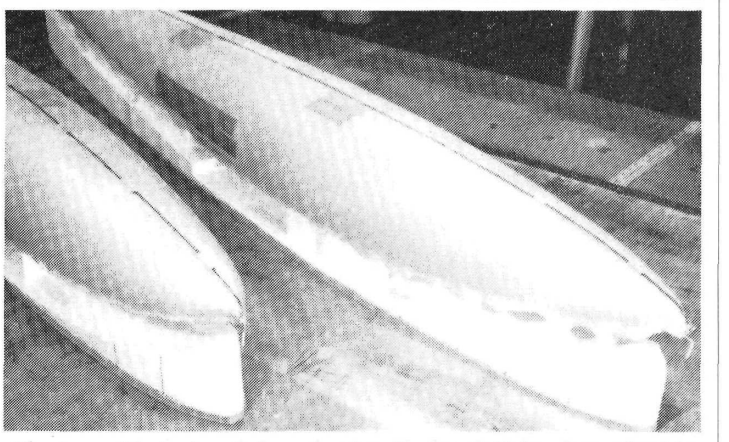
Now you're ready to pump the resin and hardener into a cup and mix it thoroughly. *Use as little epoxy as possible*. One of the best ways to do this is to paint the epoxy directly onto the foam, and then roll the cloth out onto the float, using the centerlines as a guide.

Gently dry-brush the cloth around the



PHOTOS BY JOHN SULLIVAN

Partial array of materials, which are assembled before glassing. Note center line drawn on Kevlar cloth.



Floats are blocked up before glassing. Kevlar cloth has been glued to foam core with spray adhesive because of side undercamber. (See text.)

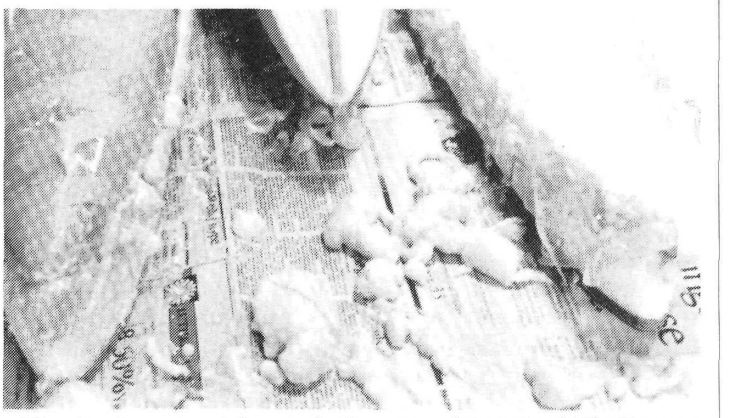
curved sides of the float. If you don't rush, the cloth will conform to a bias easily. You'll notice that the resin will wick up into the cloth and make it semitransparent. Using a spatula or squeegee, continue to press the cloth onto the wet foam core until all surfaces are of the same transparency. *Do not* apply additional epoxy unless it's absolutely necessary. You should use just enough to change the color of the cloth fibers without creating a glossy surface or puddles. If done properly, the glass-cloth will feel rough when cured and have microscopic pores throughout.

After the initial curing (about 16 hours), use a razor blade to trim the excess cloth off the float sides, and block-sand the edges flush with the bottom. Now, invert the floats and block them up again. I had previously glassed float bottoms with four pieces—for the rocker, step, cutaway and stern—becaus found it impossible to make the cloth stay down around the 90-degree corners at the step and stern. I've since discovered a spray adhesive called "Spray & Stick"* that allows me to use one piece. Here's how:

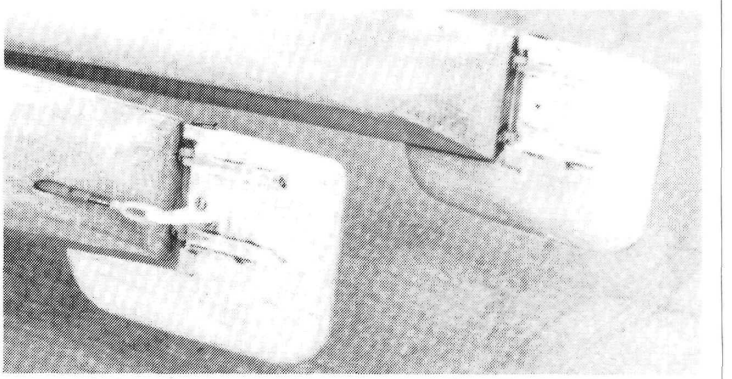
After cutting the cloth, marking the center lines and rolling up the cloth, spray a light coat of adhesive onto the float bottom. Immediately roll on the cloth, using a spatula to press it into the corners and around the step edges. Although the spray adhesive is compatible with epoxy that's either wet or cured, it's best to let the bond dry for an hour to ensure permanent contact at the sharp edges.

Now it's time to wet the cloth on the float's bottom. If you haven't used the adhesive spray, coat the foam directly, as outlined in the procedure for covering the top, and then apply the four pieces of glass-cloth. If you *have* used the adhesive, the epoxy must be brushed on and then scraped off with a squeegee or spatula to remove as much resin as possible. Remember: when the cloth has become translucent, applying more resin will just add useless weight to the float. Allow the bottom to cure for 16 hours, trim it, and block-sand the edges just as you did for the float's top coat.

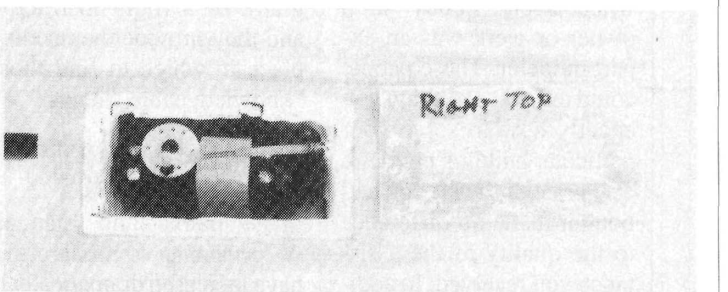
The primary glassing has been completed, and you now have a pair of floats that have a hard skin and no longer have to be handled carefully. Roughly sand the floats to knock off the glass hair that's left standing and to provide extra "tooth" for the filler coat. Unlike polyester resins, epoxy sands easily and won't accumulate on the sandpaper. For rough-sanding, 60- or 80-grit paper is adequate, and each float can be finished in minutes.



After glassing, convert the core-bottom excess into a stand. Plastic wrap protects the floats during application of spray foam, which duplicates contour of float bottoms. Excess foam is later trimmed away.



Counterbalanced water rudders are mounted on the Savoia's canoe sterns with Robart Super Hinge Point hinges. Rudders can be removed for static display.



After glassing, servo compartment for rudder control is cut out of float. Servo is located just aft of rear strut receiver block.

KEVLAR

The Savoia float tops were covered with Kevlar—a completely different ball of wax! The first change in the process occurred when covering the float tops. Because the Savoia float is round in section and develops undercamber below the hull

(Continued on page 99)

BASICS OF

OF RADIO CONTROL

by RANDY RANDOLPH

The Instructor: choose wisely; he's your most valuable asset.

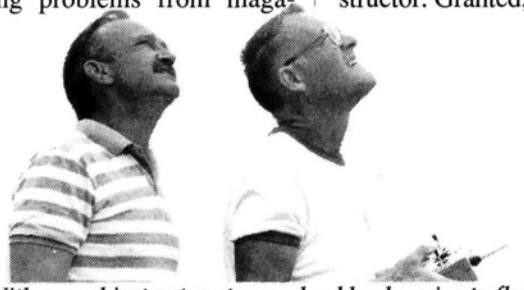
IN FICTION, THE hero grabs the controls of a racing car, speedboat, submarine, tank, steam ship, rocket, airplane, or horse and races to the rescue—learning how to drive, sail, fly or ride in no more than 10 seconds.

Unfortunately, most of us aren't heroes, and we seem to have trouble coping with relatively mundane things like a new lawn mower or the job of assembling a bookshelf—even though "full instructions" are always included. If these things give us trouble, why should we expect to build and fly an expensive model airplane from the "full instructions" that are included with kits? Obviously, we shouldn't!

We old-timers remember when every hobby shop owner or clerk was an expert modeler. These people could tell you and show you exactly how to solve your particular building problem. The price of the kit you had bought made no difference to the quality of the assistance you received. In addition, these people were always at the model flying field on the weekends to help anyone who needed help.

Very few of those shops still exist, because the trend in hobby retailing has been to high-volume discount operations and mail-order houses. The effort to hold down prices has reduced the personal contact between the seller and buyer simply because it's too expensive for retailers to spend time solving our problems.

In today's world, beginners must get help with building problems from magazines like this, local clubs, or knowledgeable friends. Although few model clubs have a regular program to school new members in basic construction techniques, almost all have a flight-training program, or a flight instructor, and they provide the meeting place in which to find those "knowledgeable friends."



With a good instructor at your shoulder, learning to fly an R/C airplane is great fun, rather than a sweaty-palm ordeal!

LEARNING BY EXPERIENCE

The books and manuals pertaining to R/C airplanes have increased dramatically in the last decade. A glance at the Air Age advertisement in this magazine shows that there's a book for almost any phase of R/C model building and flying and for any type of plane—sailplanes to jets. Learning by doing has always been good, but a sound basic knowledge gained by reading can make the "doing" much more enjoyable.

R/C flying has been the subject of hundreds of pages of text and takes considerable "doing" to learn. There's absolutely no substitute for a good flight instructor. Granted, some airplanes can be flown successfully the first time by a beginner—if they're correctly set up, warp free and properly trimmed. Such airplanes are large, low-powered, light and fly slowly, so there's enough time to correct mistakes and avoid crashing.

This type of plane is almost useless in wind, however, so flying is limited to calm days. Airplanes that will hold their own in average winds always require that beginners have the help of an instructor, who is the key to becoming comfortable with flying R/C. Clubs can and should provide excellent flight instructors.

FINDING HELP

The Academy of Model Aeronautics* (AMA) has information on U.S. model clubs. A new flier can write for a list of the nearest sanctioned clubs, visit them and choose one that suits him. It isn't always easy to choose a good flight instructor, but you should look for these things:

- He should be expert at flying any fixed-wing aircraft, regardless of size or power.
- He should be patient and gentle with his students, but also insistent that they control the airplane rather than allowing it to control them.
- He should follow a system of instruction that he has found to be successful for him.
- The most important quality of any instructor is that he should be more impressed with his students' accomplishments than with his own teaching ability.

Few other sports offer the feeling of accomplishment provided by modeling. Building and successfully flying the results of your work give a feeling like hitting a home run your first time at bat in the Major Leagues—but it takes preparation to make the Majors!

**Here's the address that's pertinent to this article:*
Academy of Model Aeronautics, *1810 Samuel Morse Dr., Reston, VA 22090.* ■

BEAUTY & the BEAST

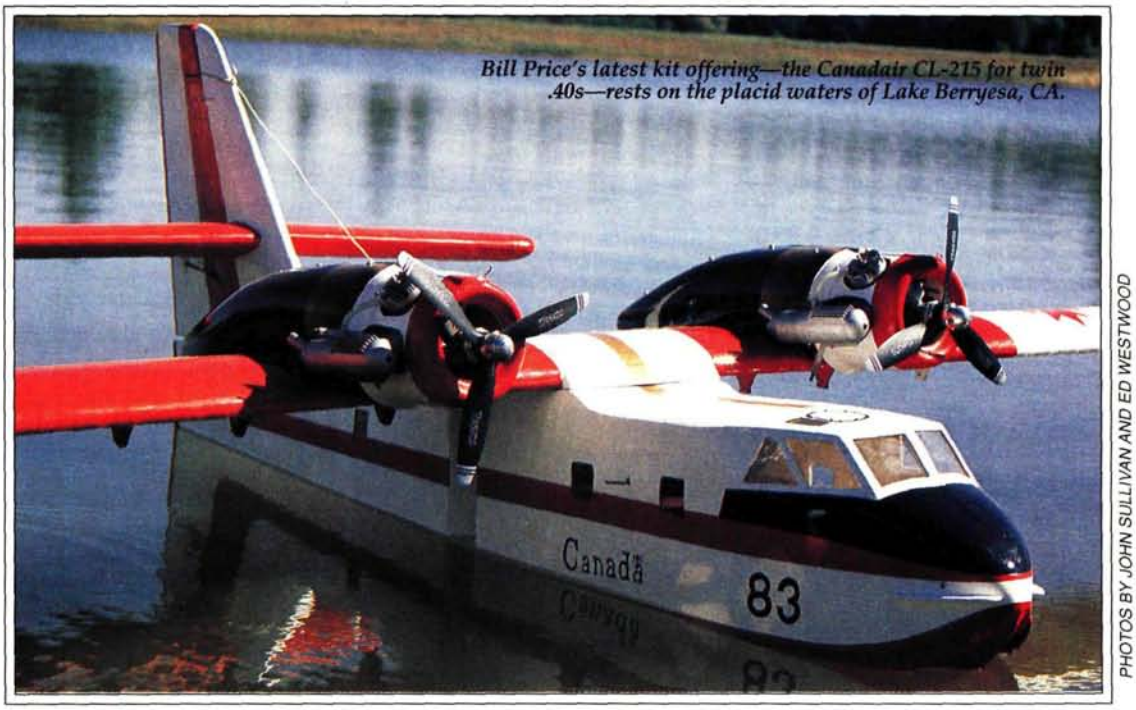
by JOHN SULLIVAN

ED WESTWOOD* AND Paul Weston refer to their creation—the Beast Sport Seaplane—as "boredom's child." While at the 1989 Clearlake Meet, Ed and Paul had a long conversation with Bill Evans about the merits of flying wings. On the long drive home from California to Spanaway, WA, Ed and Paul alternately drove and sketched while the miles of Interstate 5 rolled under them.

This might seem a strange beginning for a new seaplane, but the Beast is kind of strange anyway! When Ed and Paul arrived in Spanaway, they had the Beast's design parameters all worked out. The plane would be a flying wing with a permanently affixed pitch damper mounted across the top of its twin rudders. The twin rudder and a pair of forward strut plates would lap the sides of the square fuselage and extend down to lap the sides of the Beast's single float. The plane would have tip floats; the air rudders would also act as water rudders; and there would be a handle on top of the plane (where you usually see a canopy) for carrying it down to the water.

Paul and Ed wanted the plane to be incredibly easy to build, to have advance trainer *or* all-out stunt-flight characteristics, and to totally lack aesthetic graces. During the year that followed, before I next met Paul, Ed and the Ultimate Beast at Clearlake

"...the videotapes of weekend sessions at Spanaway Lake were getting wild and a little confusing!"



Bill Price's latest kit offering—the Canadair CL-215 for twin .40s—rests on the placid waters of Lake Berryesa, CA.

PHOTOS BY JOHN SULLIVAN AND ED WESTWOOD

IN DECEMBER 1963, the Forest Fire Protection Committee of Canada's National Research Council met to agree on specifications for a water-bomber amphibian. The requirements they agreed on called for an amphibious twin that was capable of scooping up between 800 and 1,500 gallons of water from a 1-mile-long lake with-

■ *Left: Displaying its excellent water-handling abilities, the Beast charges along on a takeoff run.* ■ *Below: Stark black-and-white bat motif heightens the Beast's sinister look.*

1990, I received almost monthly news, pictures and videos of the Beast's progress. Ed set out to build a .40-size ship, and Paul selected a .60 size. Ed's first Beast was ready to fly in only three days, so it was obviously easy to build.

EARLY PROBLEMS

There were early flight problems. The CG location had to be moved several times, and the size and location of the pitch damper was

Two extremes of aesthetics in the exciting world of seaplanes

out coming to a halt. The takeoff distance needed to clear a 50-foot obstacle was to be no more than 3,000 feet, and the aircraft had to have a 140- to 150-knot cruising speed and a stall speed of 60 to 70 knots.

Canadair Aviation was looking for a new product to make in the mid-'60s, and it responded to the Research Council's requirements with enthusiasm. The company was formed in 1944 to take over and develop the Canadian Vickers Aircraft Factory near Montreal. At the time, the plant was in the middle of producing 379 amphibious versions of the PBY-5A Catalina for the war effort. With its considerable experience with amphibious aircraft, Canadair attacked the specifications head on, and after 1,000 hours of water-tank testing, its final prototype—the CL-215—received design approval and production orders in February '66.

Since then, hundreds of Canadairs have been built, not only for use in Canada, but also for fire-fighting duties in Spain, Italy, Turkey and China. Powered by twin, 18-cylinder, 2100hp radials driving Hamilton Standard, constant-speed, three-blade props, the Canadair can scoop up 1,200 gallons of water, fly at 193mph to a fire, and then drop its water bomb with enough force and precision to smash in the roof of a burning building and drench its interior. In one pass, the CL-215 can drop its load from altitude and deluge an area of 18,000 square feet with 1 liter per square foot!

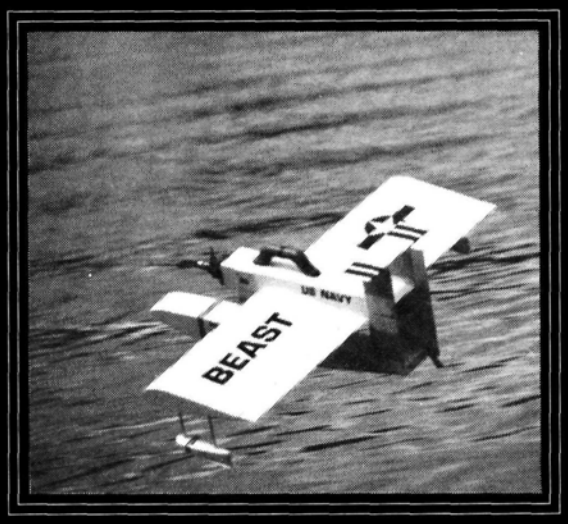
SCALE AMPHIBIANS

When Bill Price of G&P Sales* decided to produce a line of scale amphibians in 1988, the Canadair was third on his production list, following the PBY and the Grumman SA 16 Albatross. Bill's first CL-215 prototype, which I review in this issue, is done in the special commemorative colors Canadair chose for the 83rd production model in 1983. The spectacular color schemes found on the Canadair in its diverse fire-fighting roles (from the Royal Thai Navy to the Yugoslavian Air Force) make it an outstanding choice for scale modelers.

SCALE CANADAIR

As I write, Bill is organizing the first 50 kits of the CL-215. Seeing all the parts spread out helped me to appreciate the size of his task! The fuselage for the Canadair is gel-coated white and laid up with 10-ounce cloth and 1-ounce matting for reinforcement. The

BEAUTY & the BEAST



changed, too. The main float profile was altered (to eliminate the plane's tendency to dig in) and then enlarged to enhance flotation. One Beast after another rolled off the building boards, and videos kept arriving in the mail. Other members of Ed's loosely knit float fraternity were building Beasts, too, and the videotapes of weekend sessions at Spanaway Lake were getting wild and a little confusing!

Some of the Beasts had 2 ounces of lead in each wing tip and could spin inverted with only a 6-inch loss in altitude for each revolution. Others had notches cut out of their vertical fins and could tumble through the air as if they were trying to dismember themselves with the help of centrifugal force. Paul Weston's .60-size Beast was so fast that Ed couldn't keep it in the viewfinder, and the .40 Beast did touch-and-gos in an 80-foot circle. Amidst all the confusion, one thing soon became apparent: ugly as it was, the plane was beginning to look like one of the best non-scale seaplanes around.

THE BEST OF THE BEASTS

In the final weeks before Clearlake 1990, Ed and Paul

(Continued on page 104)

SPECIFICATIONS

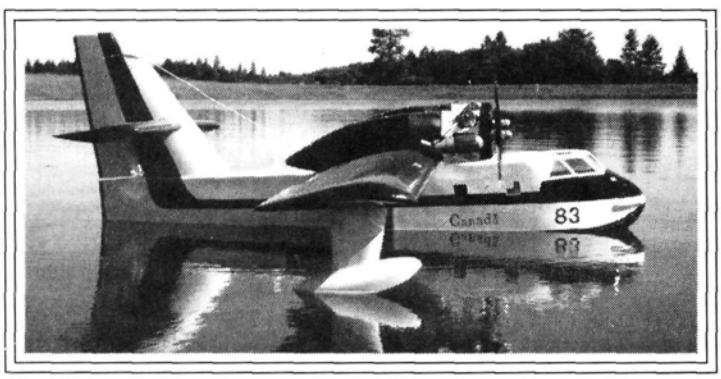
Type: *Sport seaplane*
Weight: *5.5 pounds*
Wing Area: *720 square inches*
Wing Loading: *18 ounces/square foot*
Power: *35 to 50; 2-stroke or 4-stroke*

molded halves come taped together, but the builder has to finish the seam. The fiberglass portion of the fuselage ends as a butt plate just under the horizontal stab, and the stab itself (along with the upper fin, rudder and elevator) is of sheeted foam with ply spars.

The wing panels consist of hot-wired foam-cores that are already sliced to receive the plywood main and forward spars. Wing sheeting is provided, and the tip floats are laminations of ply and balsa blocks. The single-slot flaps operate with outside standoff hinges, just like the full-scale ones. Located in the wing center section, the flaps and ailerons are rigged to run off one servo for each function. The engine nacelles come in halves that must be attached to a built-up structure that forms a tank bay and firewall for each of the two engines. The substantial nacelle halves and cowls are formed of .030 material.

Except for sheeting, which is provided in bulk, the wooden parts are all hand-cut. The wing is retained a silicone saddle by four bolts, and the radio gear is located directly under the hatch opening. Because much of the kit is prefabricated, Bill doesn't provide construction plans. When it's necessary to show details, the instructions do, however, provide sketches.

(Continued on page 105)



SPECIFICATIONS

Type: *Scale amphibian*
Weight: *13 pounds*
Wing Area: *872 square inches*
Wing Loading: *34 ounces/square foot*
Power: *Two .40 2-strokes*

by JOHN SULLIVAN

Top to bottom, left to right:

- *This Maule has been converted for STOL float work. Note Hoerner tips.*
- *Floatplane pilots are a hardy bunch! The owner of this Widgeon had to slog through 3 feet of muck to board his plane!*
- *This 85hp Rotax-powered Kitfox was scratch-built in 1989 and had tunnel-hull, inflatable, full-Lotus floats.*
- *Sea Bee owners seldom rely on stock factory color schemes, and this late-model "Bee" is no exception.*
- *This Stinson "G" was equipped with dorsal fin and sub-rudders. Early EDO amphibious float bore the original emblem.*
- *An early twin amphibian caught this spectator's attention. Note extreme positive incidence of engines; this isn't an advisable setup for models.*
- *This Cessna 182 flew all the way from Canada to Florida! The STOL conversions were done by the Horton-Canadian Aero Engine & Accessories Co. in Ontario.*
- *This Cessna Skywagon was one of many privately owned floatplanes at the Lake Parker Splash-In. Note dorsal fin added as part of the float conversion.*

PHOTOS BY JOHN SULLIVAN

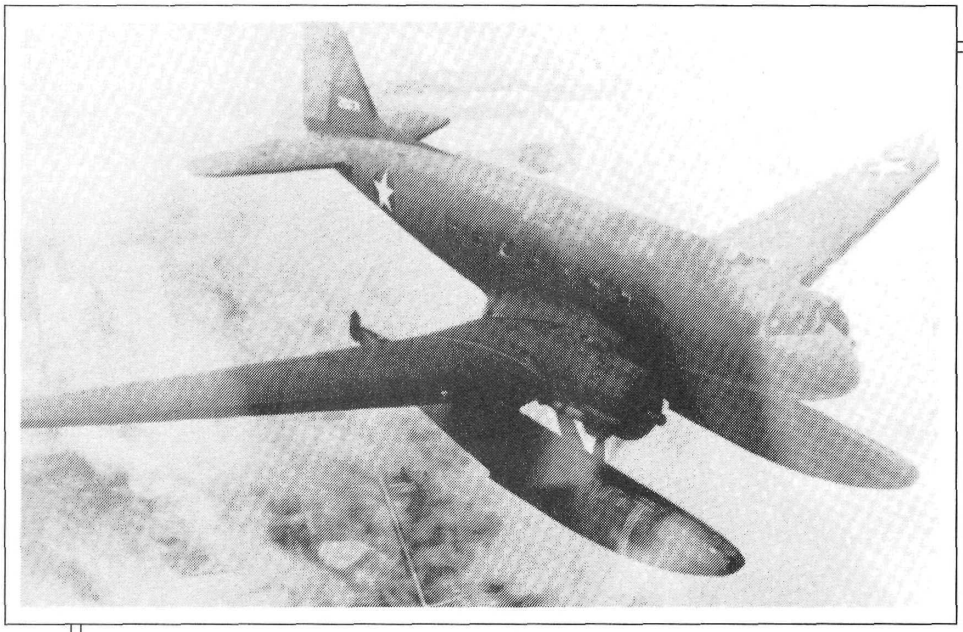
scale float DOCUMENTATION

If the airplane is scale, shouldn't the floats be also?

AS FLOATPLANE MODELING shifts into high gear, sources for full-scale documentation become a necessity. Unfortunately, our models' full-scale counterparts can't be found at local airstrips. They're usually berthed in obscure locations on lakes, bays and rivers—picturesque spots to be sure, but difficult to find. That's one of the great attractions of float aviation: living "on the hook" (anchor) and flying off to remote, stunningly beautiful moorings for a night around the campfire.

For several years, I've attended meets put on by the U.S. Seaplane Pilots Association*. During the spring, summer and early fall, this group stages at least a dozen "Splash-Ins" around the country. One event is designated as a Nationals Meet, and it's there that you find the greatest variety of seaplanes.

I was able to attend the 1988 Nationals at Clearlake, CA. This meet fostered Sullivan Float Products'* full-scale video, and there, I think I witnessed some of the wildest, close-in, full-scale flying that I may ever see!



Nothing escaped the addition of floats—not even the mighty "Gooney Bird" C-47. See a model version in "Pilot Projects."

If an FAA inspector had witnessed this circus, he would have either fainted or arrested everyone within a mile of the place!

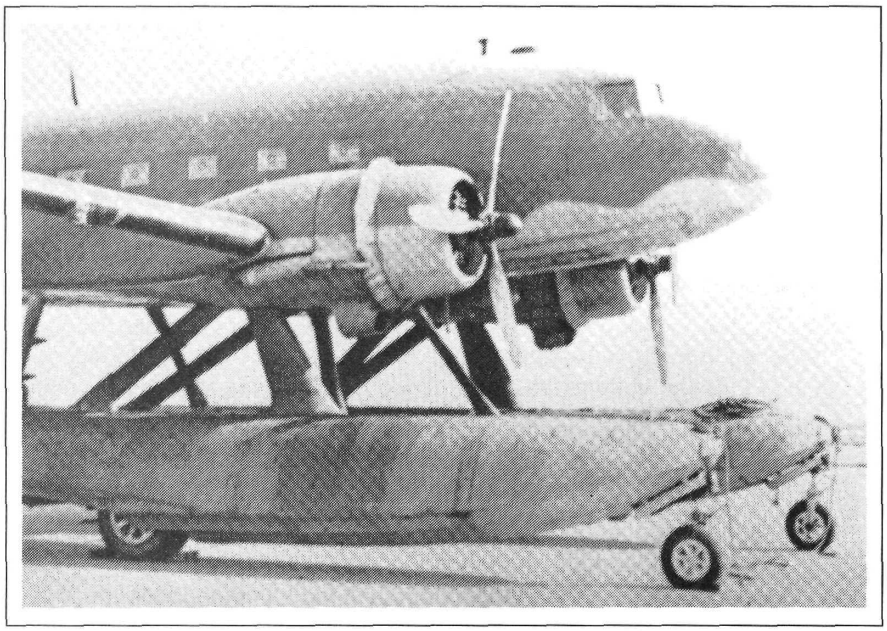
WHAT SKILL!

Unlike their land-based cousins who, when airborne, are restricted to higher altitudes, seaplane pilots are permitted to fly below 500 feet. This allows them to hone their skills in precision, close-in flying, as they wind their way down rivers and along shores, "reading" the water and looking for half-submerged obstacles before landing. I suspect that only helicopter pilots are as keenly aware of where their craft are relative to their surroundings.

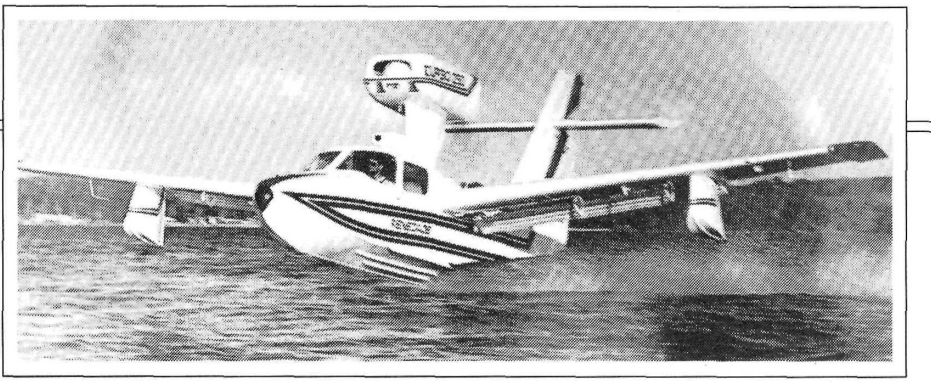
At one point during the Clearlake meet, I watched a Sea Bee taxi out from the ramp while a Buccaneer was taxiing *toward* it, just as a Cessna 182 flew over both of them during a water-bomb-drop run. At the same time, an Albatross was spinning around on one engine further out, another Buccaneer was towing a water skier between the Albatross and the drop target, and an airborne amphibious ultralight was heading in the opposite direction from that of the Cessna! All this happened within 300 feet of where I was standing on shore! Except for radio contact between the pilots, the event was totally unorchestrated! If an FAA inspector had witnessed this circus, he would have either fainted or arrested everyone within a mile of the place!

Earlier this year, I was in Florida during the Sun & Fun Fly '90 Meet. A float fly-in was scheduled for April 13 on Lake Parker in Lakeland, FL, where I took many of the shots that accompany this article. The Lake Parker Meet was toned down somewhat (perhaps somebody got after these guys!), but still a pleasure to witness. Most of the floatplanes were standard fare: Cessnas, Maules, Cubs, Stinsons and Sea Bees, with an occasional Kitfox or Widgeon thrown in for variety.

All the planes were in top condition, and it was an excellent opportunity to view struts, fittings, rudders and emblems in a relaxed atmosphere on one of the prettiest



Dual-purpose floats fitted to Douglas C-47. Retractable "land" gear enabled operation from standard runways or waterways.

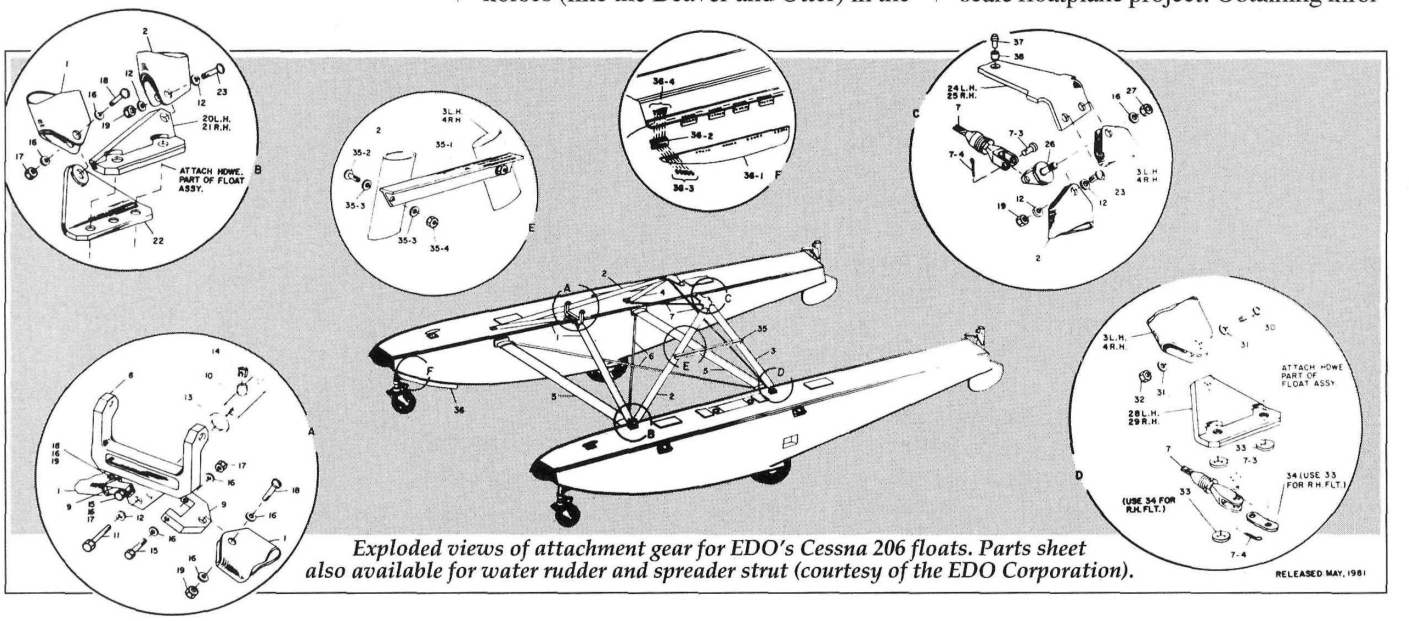


A Turbo Lake Renegade blasts into the air! Note extended flaps, aileron correction and up-elevator. (Photo courtesy of "Water Flying.")

lakes in Florida. Everyone there was "on vacation," and the owners and pilots were more than willing to show off their floatplanes and answer questions.

floatplanes at remote meets, large amphibians (like the PBY and the Albatross) at meets held near large metropolitan areas, and bushplanes and workhorses (like the Beaver and Otter) in the Pacific Northwest and on the Northeast Coast.

After you've picked a scale subject, contact the manufacturers listed. Most will be happy to send you brochures and—with a little encouragement (try money!)—tear sheets from their stock parts catalogues. Good luck with your scale floatplane project! Obtaining information may be an involved process, but it will take you to places that are just as intriguing and beautiful as the sites where you'll be flying your scale floatplane. It's a win/win situation, and there aren't many of those anymore!

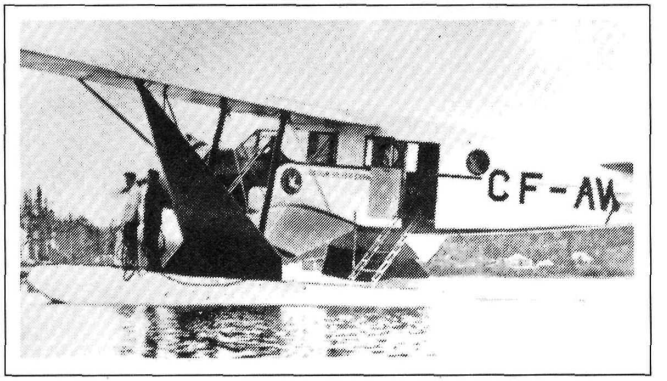


Exploded views of attachment gear for EDO's Cessna 206 floats. Parts sheet also available for water rudder and spreader strut (courtesy of the EDO Corporation).

SEEKING THE SOURCE

The sources listed at the end of this article will help you in your quest for scale documentation and photos, but none can help as much as a call to the Seaplane Pilots Association and a subscription to its *Water Flying Magazine*. This magazine is published quarterly, and in the expanded annual issue, you'll find ads from most of the major seaplane ports in the U.S., event schedules and information about manufacturers.

You're likely to see privately owned



On floats, the Bellanca Air Cruiser weighed 11,700 pounds and cruised at 99mph. The distance between the floats was almost 20 feet!

**Here are the addresses that are pertinent to this article:*

U.S. Seaplane Pilots Association, *421 Aviation Way, Frederick, MD 21701.*

Sullivan Float Products, *1421 Second St., Calistoga, CA 94515.*

EDO Corporation, *Government Systems Division, 14-04 111th St., College Point, NY 11356-1434.*

Wipaire Inc. Floats, *8520 River Rd., Inver Grove Heights, MN 55076.*

Zenair Floats, *King Rd., Nobleton, Ontario, Canada.*

Kitfox Floats, *Denney Aerocraft Co., 6140 Morris Hill La., Dept. S, Boise, ID 83704.*

PK Floats, *DeVore Aviation, 6104 Jefferson NE, Albuquerque, NM 87109.* ■

QUIET FLIGHT

F3E, F3J and England bound

by JOHN LUPPERGER

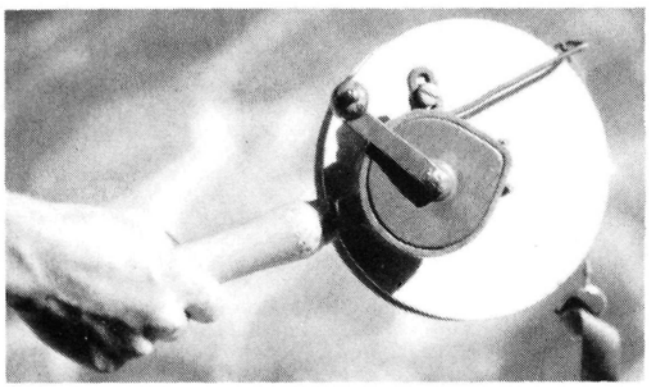
"VARIETY IS THE spice of life" is a statement that we've all heard, or said, at one time or another. It's extremely true in our R/C hobby which offers us variety through its many facets. If we get tired of what we're doing, or want to expand our horizons, we simply try something new.

Lately, I've been interested in electrics, but, once again, I find myself wanting to fly gliders and return to competition. Perhaps it's because I've almost finished work on two new thermal machines: Larry Jolly's Cheetah and Mark Allen's Falcon 880. If you find your interest waning, look around and try something different, but for heaven's sake, make sure it's *quiet*!

HAND TOWING

I'm writing this just one week before I leave for England to fly in the World Interglide 1990. This F3J event is designed to help it achieve recognition as an FAI International Championship, and it's the event Americans have been waiting for: a thermal duration contest (something at which we excel). The only "fly" in the ointment is that Americans don't hand-tow, which is the F3J launching method.

To learn about hand-towing, I borrowed a British hand-winch from my friend Bill Forrey. At first, I was apprehensive because the tow person, rather than the pilot, has more control of the stresses on the plane while it's being launched. It's true that the pilot can add down-elevator to relieve stress, but this also increases air speed and can create other problems. The tow person controls the line tension (and stress) by the amount of forward speed he can generate by running, jogging, or even walking when the wind is up.



This British hand-tow winch is a very sturdy unit that seems to have been made out of a hand drill. The line is monofilament that's stretchy so it can be used for a zoom at the proper point in the launch.

PHOTOS BY JOHN LUPPERGER

Jerry Bridgeman, top scorer at the F3E team trials, waits to launch a fellow competitor's aircraft. Most of the present F3E ships are about 80 to 90 inches in span, weigh 6.5 to 7.5 pounds and are powered by special-wind Astro Cobalt 60s.

In practice, I found that it wasn't as difficult as I thought it would be. The tow person must be an experienced pilot who's capable of assessing how much stress he's putting on the glider during the launch by the tow line's feel and by observation.

At the field, I launched 2-meter and 3-meter Gnomes, the Project Sophisticated Lady, an Oly II and a vacuum-bagged original 2-meter design. Naturally, the smaller 2-meter ships were easier to launch in both calm and breezy conditions. The 2-meter Gnome has a very strong wing and, on one occasion, I actually launched it higher than usual on a winch (there was a 7 to 10mph breeze). Other pilots tried towing and agreed (despite discovering that they were out of shape) that it wasn't difficult, and that the results were satisfactory.

The big advantage of hand-towing is that you can launch into the wind, and winch failure isn't a problem. This enables the contest to run quickly and gives you the ability to launch more aircraft in each flight group. Its only disadvantage is that each pilot must have a launcher as well as a timer.

While I'm in England, I'll try to find a source of

(Continued on page 34)

hand-winches and perhaps have some shipped here for others to try. Who knows? Maybe you'll be flying club contests using a hand tow in the near future.

F3E TEAM SELECTION

The team selection for the F3E World Championships took place at the Harbor Soaring Society's field in Costa Mesa, CA, on June 1 and 2. Eight stern and hardy competitors came to vie for a place on the U.S. World Team. When the dust had settled, Jerry Bridgeman (previous team member) was in 1st, Jason Perrin, 2nd (first time on team), Steve Neu, 3rd (previous team member), Bob Sliff, 4th (team manager). All the team members know one another and are from Southern California. They've been sharing ideas and supporting one another's efforts during the past year. They are, in every sense of the word, a *team* and this should improve our chances for a good showing. From past experience in world competitions, we know that a team effort produces the best results.

HOW WE RATE

Bob Sliff compiled some statistics for those who are interested in our chances at the Champs:

By comparing laps (a major part of the competition), it's possible to see how we rate. At the '88 Champs in St. Louis, World Champion Rudolf Threudenthaler had the highest number of laps at 23 (once achieved by the 2nd-place finisher). The word is out that some Europeans (the top fliers) have been completing 26, 27 and, on occasion, even 28 laps! Bridgeman made 25 laps once, 24 laps five times and 23 laps twice. Perrin made 24 laps three times, 23 laps three times and 22 laps twice. Neu made 23 laps three times, 22 laps three times, 20 laps once and 16 laps once.

Jerry Bridgeman launches a fellow competitor's F3E ship. The climb rate is phenomenal—about 5,000 to 6,000 feet per minute!

The average motor runs for the duration part of the event were: Bridgeman—6.25 seconds (one flight, no motor run at all; one flight, only 1 second); Perrin—10.12 seconds; and Neu—11.80 seconds. Out of a possible 240 perfect landing points, Bridgeman scored 225 points, Perrin 220 points and Neu 225.

We have a dedicated team headed to Austria, and after practice, practice and more practice, I know that they'll represent us to the best of their ability. Good luck, Team USA!

RADIO À LA MODE?

This piece has appeared in various newsletters over the years. I don't know the original source, but I'm sure it came from someone who was frustrated by all the new

(Continued on page 106)

1/4-SCALE ASK-18

Some of you may remember last year's pictures of Gary Brokaw's 1/4-scale Minimoa. Gary is an avid scale fan and has a special affinity to vintage-style sailplanes. He recently finished a 1/4-scale ASK-18 with a 157-inch wingspan. Both of these plans are from the English MAP-Argus plan line that's available from JM Lupperger Plans*. Although the ASK-18 isn't a true vintage sailplane (it was designed in 1972), the full-scale is all wood and has the character of an older aircraft. Here are Gary's comments on the ASK-18:

"I've enclosed pictures of the ASK-18 I finished a couple of months ago. I used the plansfor this project that JM Lupperger Plans imports from Argus Publications. They were well done and would make a very good first-time scratch-building project. Cliff Charlesworth, plan designer, was helpful in finishing the ASK-18.

As with the Minimoa, I would be happy to help anyone who's considering this project. The ASK flies extremely well off both the slope and the winch. So far, I've logged flights of over 15 minutes at both locations. Thank you again for all the help and good advice."

If anyone wishes to contact Gary Brokaw, write to him at 2615 S. Cherry St., Spokane, WA 99216. Thanks for the pictures and update, Gary! We look forward to seeing your next project, which I understand is the German Habicht.

Gary Brokaw holds all 157 inches of his recently completed ASK-18. The model has excellent flight characteristics on the slope or off the winch. Check out that white, powdery stuff all over the ground; that's what I call dedication to the hobby!

■ *Left: Part of the Library Park pit area on Saturday afternoon. There were 147 pilots, who registered over 200 floatplanes!*

■ *Just below: Bart Van Syoc's Quadra 50-powered Great Lakes trainer thunders by. This plane weighed 24 1/2 pounds, and it had Sig floats and a Cirrus radio for guidance.*

■ *Directly below: "Northwest Float Flyer" Editor Ed Westwood and I.A.C. hopeful Bill Curry check out Westwood's EDO and Sea Era floatplanes.*

■ *Above left: Dick Aubert and a helper retrieve Dick's champion, 1/5-scale, 85-inch Piper Super Cruiser on Sullivan floats. This 11 3/4-pound floatplane is powered by an O.S. 90 and has a CH ignition.*

■ *Above: Paul Lockwood's Great Planes Corbin Baby Ace was powered by an O.S. Gemini 1.20 Twin. The 11 1/2-pound plane had 40-inch Sullivan floats and MonoKote covering.*

■ *Left: Ralph and Phil Burton brought their 90-inch-span 1919 Avro 539A Schneider entry all the way from Lake Havasu, AZ. Its Zenoah G62 couldn't manage a takeoff, so they may have to modify for more power.*

Clearlake '90

Three days of aquatic, airborne adventure

by JOHN SULLIVAN

PHOTOS BY JOHN SULLIVAN

The Konockti Range forms a backdrop for Richard Moore's O.S. 160 twin-powered Lazy Ace. Richard scratch-built the 56-inch pylon float of foamboard, lite-ply and balsa sheeting. The Lazy Ace was built by the late Roy Price.

I CAN USUALLY begin a report about *MAN's* annual trek to Clearlake with a description of the natural wonders that await avid floatplane enthusiasts there—clear waters lapping on sandy beaches, shady willow trees swaying in gentle breezes, and lofty white clouds hanging motionless in blue skies. Completing my picture of Clearlake 1990, however, are images of backhoes, rubber-tired loaders, yards of mulch, exposed sprinkler systems and an army of Public Works employees!

WHAT A MESS!

The City of Lakeport tore up Library Park for a beautification project, and when the 3,000 spectators and 147 registered pilots (with their 200 floatplanes!) showed up on Friday morning, the place looked like a demolition zone! I have to give credit to the city crews and the pilots: I've never seen such a spirit of cooperation and determination to make something work despite enormous obstacles. Somehow, the Public Works crews put down 6 inches of mulch over a half-block that also served as a pit area for the meet!

By Saturday morning, the crews had moved to the other half of the park, and things returned to a *normal* level of mayhem! The weather was sunny and clear, and winds were light to moderate; they blew on shore most of the day and then shifted to a brisk offshore breeze by mid-afternoon. When those afternoon winds came up (10 to 15mph, with some stronger gusts), pilots could either take off crosswind or downwind. Except for a few heavily loaded or high-performance ships that need speed to get effective rudder, everybody made it up and back down in fine style. Under adverse conditions, floatplanes do as well—and perhaps better—than their land-based cousins.

The Clearlake Modelers' organizational skills and frequency control were well-tuned. As many as 10 planes flew at once, and only the faint of heart passed up the chance to fly when the sky was half-darkened with floatplanes. The quality of the aircraft was good to very good; it seems that weird, makeshift setups are a thing of the past.

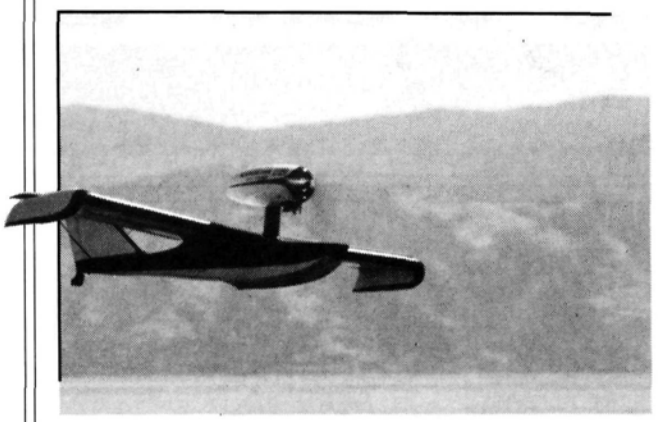
WHAT A SHOW!

The aircraft were as varied as could be: I saw everything from pylon-float X-wings to scale Cessna 182s to a 1/3-scale Schneider Sopwith Tabloid. About a third of the pilots returned this year with their favorites; another third were veterans with new ships; and the rest were fliers at their first Clearlake meet.

The presence of the Schneider Racers was something else! These ships have become instant classics in our corner of the hobby. It's like driving up to a Volkswagen Regatta in a 1913 Rolls-Royce Phaeton—everybody runs over to see what you have! Three Schneiders at Clearlake had competed at Havasu in 1989: a 1919 Avro 539A, a Macchi M65 (that put in some rock-solid flights) and the Sopwith Tabloid mentioned earlier. The Schneider Racers embody the essence of floatplane history, and their beauty comes from the fact that they range from old ships (with the shaft sticking through the radiator) all the way up to twin, 12-cylinder, fire-breathers with contra-rotating props!

Float flying's "old man of the

Clearlake '90



Paul Stiener doubled an Ace 40 Seamaster to create this 108-inch prototype Sachs 3.7-powered Sea-monster. The 30-pound amphibian has a glass fuse, and a Futaba PCM for guidance.

sea," Ed Westwood, drove down from Washington with his new EDO XOSE1. The EDO is definitely Scale Masters quality, and it's a fine flying ship, too. Ed also had his new Beast sport plane (see the report elsewhere in this issue), which he and Paul Weston have been refining for a year, along with a spinoff of Paul's Sea Era—the Stealth. Paul put the Stealth through its paces on Saturday afternoon, and it was hot!

Bill Price showed up with his new Canadair kit (also in this issue). He displayed it, his Albatross and his PBY, which started a lot of people thinking about amphibians!

Bill Evans brought a stable of flying wings up from Southern California, including his X-wing Astron 60. These wings fly like untethered fast-rat combat ships, but they're amazingly easy to fly.

Doug Wilsman showed up with his second, 11-foot, eight-engine Spruce Goose. (The first one "bought the lake" at Havasu.) He has passed on the flying of this bird to a fearless 17-year-old high school senior named Shawn Whisman. Shawn looks like an honors student, but the minute he gets a transmitter in his hand, things get bizarre.

Shawn made the Spruce Goose fly inverted for 100 yards at 3 feet above the water, and Doug dared him to get closer! Howard Hughes thought he had a great amphibious cargo plane. He never realized that the Goose does a very respectable eight-point roll!

WHAT A SHAME!

And then there were the crashes. Of the approximately 200 ships—and who knows how many flights!—there were about four total wipeouts and a dozen forced entries that were repairable. Chuck Fuller's Extra 230 got caught in the afternoon wind shift and splattered all over the dock, though. It's sad to see such a beautiful ship get smeared. Unfortunately, I speak from personal experience. After I handed the transmitter to another pilot (who shall remain nameless), my latest favorite, the Pilatus-Turbo-Porter, had an encounter of the worst kind with a sailboat mast. The Porter is repairable, but the next four weeks of my spare time will be painful.

WHAT'S NEXT?

As usual, the Clearlake Club took care of the visiting modelers' every need. We even ate at the Lakeport Yacht Club facilities a block away from the flying site, and the surroundings were appropriately—and delightfully—nautical!

Clearlake has ended for this year, and we have almost a year to wait for the next one. At least, we have the three days of good times and friends to think about whenever we're bored silly and wish we were somewhere else. That's what Clearlake is: a place you'd rather be. Once again, a heartfelt thanks to Bill, Art, Wally, Ray, Mo, the retrieval crew, the impound staff, the wives...all of you. We really appreciate what you do, and, most of all, thanks for the memories. ■

SMALL STEPS

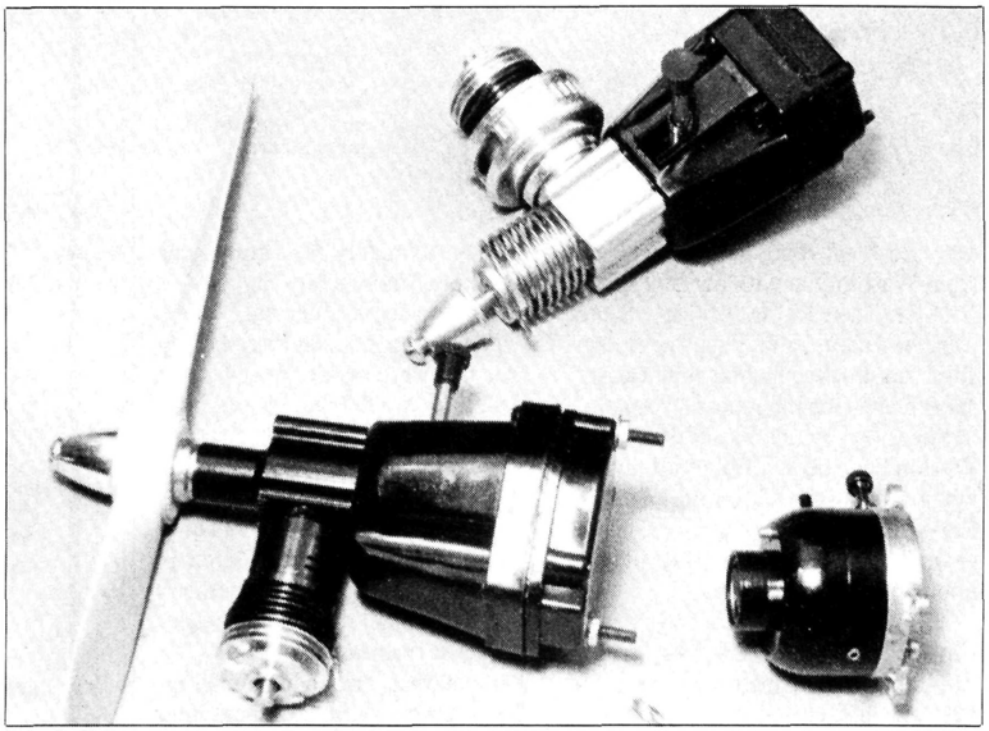
Enduro tanks, solving weighty problems and aileron actuators

by JOE WAGNER

MANY R/C FLIERS who use Cox* reed-valve engines (e.g., the Black Widow and the QRC .049) are unhappy with the short run times their stock fuel tanks give them. I just received a letter from Tony Turley (of Dunbar, WV), who has this problem.

Most of my 1/2A R/C airplanes use an auxiliary fuel tank that's connected to the lower vent tube of the Cox's built-in tank. The auxiliary tank has a single vent of its own. After closing the needle valve to prevent flooding the engine, I fill the system through the Cox tank's top vent until fuel runs out of the auxiliary tank's vent. I seal the stock top vent with some plugged fuel tubing, open the needle valve, and my engine is all set for another 12-minute run!

Tony, however, tells me that his model doesn't have room for an auxiliary tank. He read an earlier column in which I said a Cox Dragonfly tank would work on a Black Widow. To make sure, he called the Cox Hotline; they told him "Not so!" As a last resort, Tony asked me about a tank extension for Cox .049s that he'd heard of somewhere.



Cox Hobbies says it can't be done, but here's a Black Widow with a Dragonfly's tank assembly. This is an inverted setup; the stock sidewinder Dragonfly is at rear.

The only Cox Tank Extension Ring that I know of is made by Graupner in West Germany. Most of this company's products are first-class—I especially like Graupner propellers!—but its Cox tank extender definitely is *not*.

The screws that come in the Graupner kit (which replace the stock Cox screws) are a little too long, and their threads fit too tightly into the Cox case. When you

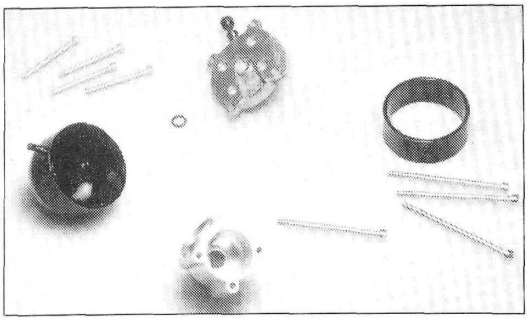
This clever Swedish aileron actuator is very simple and weighs only .10 ounce, so it's perfect for installation in a wing with a thin airfoil.

THE SWEDISH SWINGEE

Scale-type ailerons work as well on small R/C airplanes as they do on large ones. Yet, few scale models powered by engines under .15 are equipped with ailerons. There's limited space within a small wing, and it's difficult to fit bellcranks and their linkages inside a thin airfoil.

The Swedish-made Swingee (available from Ace R/C*) is an excellent solution to this problem. This ingenious cam-operated device combines a hinge and an actuator in a single assembly—one for each aileron, of course.

The Swingee converts a direct push/pull motion from a servo in the wing center section into an up/down aileron deflection. Its compact size and light weight (a mere 3 grams, including the actuating ball link that comes with it) make the Swingee a great choice for .049-powered Cubs, Porterfields, or Aeronca Champs. So build that plane you've always wanted—equipped with "full-house control"—and do sideslips, knife-edges and all the other neat flight maneuvers that require the rudder and ailerons to work independently!



Graupner's Tank Extension Kit (at right) didn't work on this Cox motor. Note the broken screw, with its stub jammed into the Cox case.

reassemble a Black Widow with Graupner's tank-extender kit, it's easy to jam one or more screws into the case. Then, when you try to remove the screw, it breaks off level with the case's back and ruins everything! (The voice of bitter experience!)

Although I dislike contradicting the gang at Cox Hobbies on anything regarding their engines, a Dragonfly tank *will* work on a Black Widow. I've done the modification, and it's not difficult. There are only two things to remember:

- First, the motor won't run reliably with its cylinder in the usual upright position. Because the Dragonfly tank's air intake is at its top front center, an upright cylinder in front of it will blow exhaust directly into the intake area. A sidewinder installation (like the stock Dragonfly's) works well, however, as does an inverted setup.
- Second, because of manufacturing tolerances, the screw holes may not line up precisely. (By the way, Dragonfly tank screws must be used; the Black Widow's are far too long.) If there's any mismatch, it will be only a few thousandths of an inch, so just drill the holes in the plastic tank slightly larger. A no. 41 drill bit, held in a pin vise and turned slowly by hand, did the job easily—and safely—for me.

**Here are the addresses of the companies mentioned in this article:*

Cox Hobbies, Inc., *350 West Rincon St., Corona, CA 91720.*

Hannan's Runway, *Box 860, Magalia, CA 95954.*

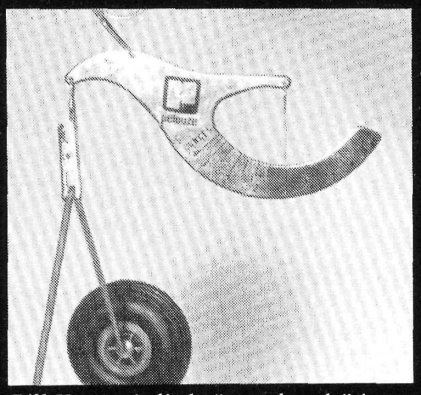
Ace R/C, *116 W. 19th St., P.O. Box 511C, Higginsville, MO 64037.* ■

EVERY OUNCE COUNTS

As Randy and I preach to you over and over again, the best way to achieve great performance and long life from small R/C airplanes is to keep them light. Unfortunately, it's easy to let the weight accumulate as we build and finish our planes. An extra half-ounce in a 1/2A firewall (that's 1/4 inch thick, when 3/32 inch would be strong enough) isn't much. Add a half-ounce in insufficiently sanded fuselage sides, another half-ounce in tail surfaces made of balsa that's too hard, and as much as 2 ounces in the wrong type of wheel, though, and by the time the model is ready to fly, it's 8 ounces heavier than it could be!

To prevent this from happening, weigh each part as you're making the model. When you see how much mass each component adds, it becomes easy to take corrective measures.

Until now, though, weighing R/C model parts accurately was difficult and required scales more suitable for a pharmacy than the rough-and-tumble environment of a modeler's workshop! With the ingenious little "postal scale" that my old friend Bill Hannan* recently made available, model weight control is easy!



Bill Hannan's little "postal scale" is an ideal weight-control tool for small R/C models!

The scale's simple design allows it to be used anywhere, any time, and neither balsa dust nor castor oil affects it. The scale's maximum capacity (4 ounces, or 80 grams) limits its usefulness to weighing individual components rather than complete R/C aircraft, but for helping you pare down stabilizers, servo trays and tailwheel assemblies, this little gem can't be beat!

Remember: in small R/C airplanes, every ounce counts. With a handy scale to count them, you'll be able to build planes that fly better than ever!

FIFTY YEARS AGO

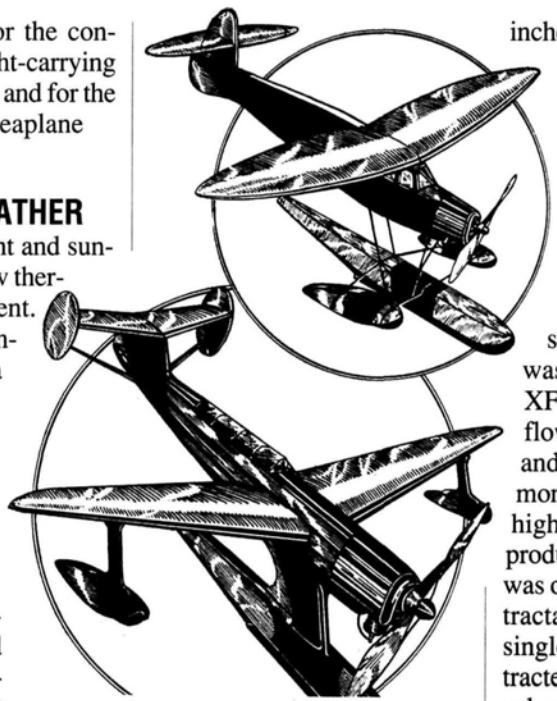
"Weathering" the heights

by KATHERINE TOLLIVER

WEATHER REPORTS—they appear frequently in *MAN*. "It's a beautiful summer day, with clouds and blue sky mirrored in the calm surface of the lake. Two graceful models rest on the shore, engines idling smoothly and evenly." So begins the October, 1940, article entitled "Seaplane Pointers" that was full of diagrams and practical suggestions on how to create efficient seaplanes using many different designs. The theory of takeoff as well as step action and suction effect were discussed. Back then, a single-float design was considered to be the easiest to build and fly with its medium-length, narrow-beam float that was supplemented with small auxiliary floats or sponsons. Twin floats were thought to be the trickiest—quite a change from today, where the reverse is true. The specifics of seaplane design were promised in a future article, e.g., plans for the construction of a weight-carrying gas model seaplane and for the construction of seaplane floats.

STORMY WEATHER

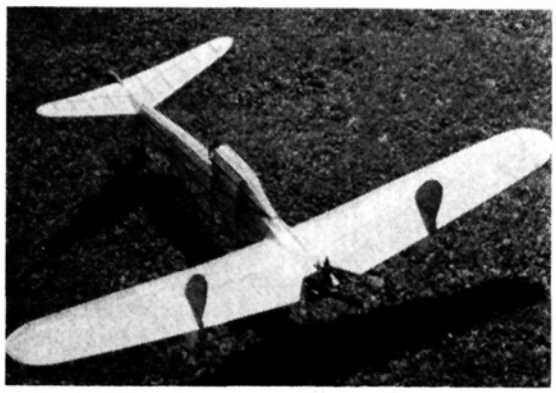
"The day was bright and sunshiny; however, few thermals were present. Flights continued until interrupted by a severe thunderstorm. After an hour's delay, the field dried sufficiently to resume flying. On the whole, the times weren't high, because of the dead air." Sound familiar? This was part of the "Gas Lines" column that described the 6th annual All-Eastern Gas Model Contest sponsored by *MAN* and Kresge's Department Store of Newark, NJ. As usual, Frank Ehling entered one of the most unusual ships—a twin-engine job that had a Class A engine mounted in the fuselage nose and a smaller Class A engine mounted at the wing's trailing edge. To fly Class A, one motor was detached from the plane. Unfortunately, a midday shower ruined the wing covering before it was fully tuned up.



Top: Gas model with triple-float combination. Bottom: It's hard to believe that the floatplane is 50 years old. Single-float popularity has given way to twin-float configuration.

SHIPBOARD FIGHTER

The Vought Sikorsky XF4U-1 single-seat shipboard fighter was featured on the October '40 cover. Its overall length was 31 feet, 6 inches, and its wingspan was 40 feet, 3½ inches. Its most novel feature was the inverted gull-wing front profile that created a lower center of gravity. A shorter landing gear made the carrier-deck arresting procedure safer, and wing-to-fuselage streamlining was improved. The XF4U-1 reduced air inflow toward the fuselage, and it was the first full monocoque, spot-welded, high-powered ship to be produced. Its landing gear was one of the first fully retractable types used on a single-seat fighter. It retracted in the normal vertical position and was completely sealed off from the air stream by clam-shell doors. The Pratt & Whitney R-2800 double-row radial engine was the largest air-cooled engine to be installed on a service-type air-



A canard free-flight in 1940...and you thought that Burt Rutan was among the first to build "tail-first" models!

plane. This plane served as the prototype for the famous Corsair—the mount of many Pacific aces.

A "new sensation" in gas models—the canard plane—was unveiled in an article entitled "Tail First With Gas Power." This ship was the first of its type to be built and flown successfully. Its secret?—the center of gravity was located well forward of the rear wing. A forward landing gear also helped. This ship glided well ("like a pancake"), it never approached a stall, and it seemed to keep its nose down no matter what the speed. On its first run, with an 18-second motor run, it was up for more

Frank Ehling with his "twin motor."

than 2 minutes. The word used in 1940 that best described this high flier?—"swell!"

HELICOPTER CHALLENGE

After reading a brief history of indoor model helicopters, you could have built your own. Carl Goldberg did. He attended the first important helicopter contest and achieved the best flight time of 2 minutes, 47 seconds. His light, beautifully constructed ship had a pair of three-blade props about 2 inches apart, an enclosed motor and a stationary vertical fin. The article mentioned that if you had any difficulty flying or constructing it, you could write to *MAN* for assistance. Fifty years hasn't changed that policy—you can still write to us. ■

duke's mixture

This month, I would like to share a few gems from our repair department.

CUSTOMER: It just nosed over. I think it was defective to break so easily.

REPAIRMAN: *Hey, Joe, did you ever see a ball bearing bent from a crash?*

CUSTOMER: It can't be bum fuel. My O.S. ran good on it until it quit and crashed.

REPAIRMAN: *P. T. Barnum was right.*

CUSTOMER: It ran good on the test bench, but when I went to fly, it had no compression.

REPAIRMAN: *If you have to look, please put the rod back on the crankpin.*

CUSTOMER: The third time I went to fly, the muffler disappeared. Please replace.

REPAIRMAN: *We didn't build mufflers for the 1962 model 15.*

CUSTOMER: I bought this Fox motor at a flea market. It wants to run backward. What is wrong?

REPAIRMAN: *Tell him to buy a pusher prop.*

CUSTOMER: Dear Sir: The enclosed 3.5 outboard has a screw missing from the head. Please send me a new one.

REPAIRMAN: *Hey, Joe, shall I just put a screw in it and send it back, or send it to K & B?*

CUSTOMER: I bought your new Eagle 4 and installed it in my Senior Falcon. The first flight your motor broke the wing. It must have been defective.

REPAIRMAN: *The motor, the wing, or the brain?*

CUSTOMER: I have flown this motor about 30 flights and it went good until my friend's tach showed it was only running 9200 RPM. Your owner's manual says it should be turning 13,000.

REPAIRMAN: *Did your friend build his tach himself?*

CUSTOMER: The kit I bought said it would take motors from 19 size up to 1.20, but this 25RC won't fly it. I am using a 14-8 prop like the kit says.

REPAIRMAN: *Hey, Joe, what shall I tell this guy?*

CUSTOMER: This Fox 45 was flying like gangbusters when suddenly it stopped. Something must have broken inside. Please repair under warranty.

REPAIRMAN: *Dear Sir: We found the screw you lost jammed between the crankshaft and case.*

Kidding aside, 99% of our repair customers are very reasonable, and quite happy to pay our modest charge. It may interest you to know that our #1 cause for repairs is now lubrication failure, #2 cause is crashes, and #3 cause is normal wear. Ten years ago we seldom saw a lubrication failure.

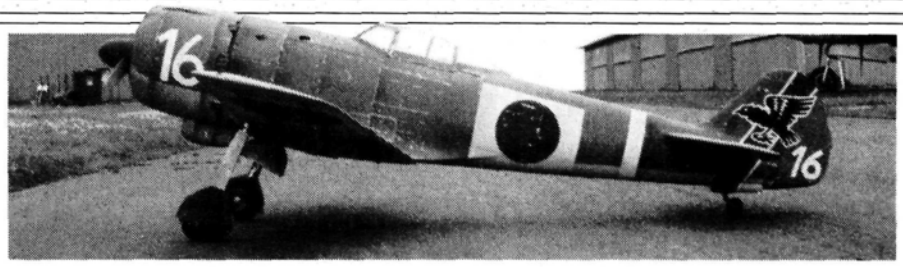
Happy flying

Duke Fox

SPORTY SCALE

TECHNIQUES

by FRANK TIANO



Wayne Siewert's KI-84 Frank from Smith Plans. It spans 88 inches, weighs 29 pounds and uses a G-62 for power. Very realistic setting shows why we don't like tall weeds around tires!

I'M WRITING this in July, even though you're probably reading it September. The temperature here in Florida is 94 degrees, and the humidity is 98 percent. I really shouldn't complain, though—Top Gun is over, (it was a huge success), my KI-84 is ready for the Dallas Scale Masters, and I've received a lot of information and pictures that will help you with the upcoming building season.

SCALE WHEELS WITH HUBS THAT SURVIVE

I've talked about Hangar One* before—you know, the outfit that produces Ziroli* kits. Owner Tom Wilkinson just shipped me a pair of his new Corsair wheels. These all-aluminum beauties are quite a work of art, and Tom says he plans to make some for the Platt P-51 and for a few Byron kits. Tom is fitting these wheels with Du-Bro tires. The set shown in the picture is for the Ziroli Corsair, but it will also fit other large-scale models.

For a better scale look, left and right Hangar One hubs screw together on Du-Bro tires.

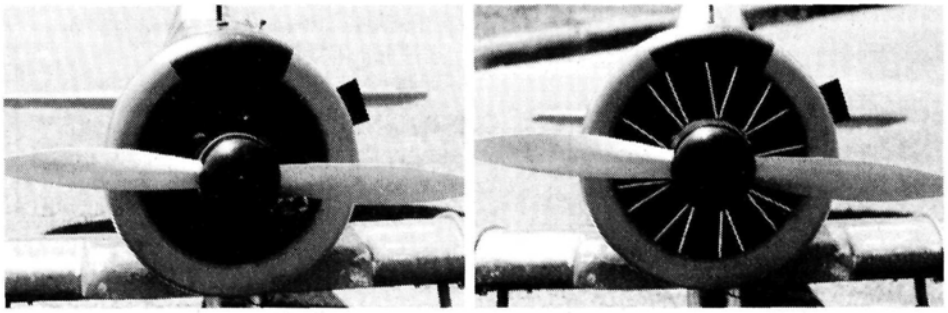
FRANK 3

Last year, I told you I was building a new KI-84 Frank from Don Smith* plans. It has been finished for some time now, and it already has its first contest scars. The airplane flew very well, but it was underpowered for the kind of flying that I like to do. So, out came the old, reliable Bully, and in its place, I anchored a new Zenoah* G-62. It's sitting right at 30 pounds, but this G-62 hauls the 84 around as if it were a matchstick! Wayne Siewert of Minnesota sent me some photos of his new Frank. I wish that I had picked his color scheme, but it's too late now! One thing's for sure; the Professor's designs sure do fly well!

IS HALF A HEAD BETTER THAN NONE?

By now, I've done so much advertising for our dummy radial engines that I can hardly keep up with the orders. I do appreciate your response, but keep in mind that these dummy engines are simply the *front half* of an engine. They're meant for cowl installation only; they're *not* meant for use on AG-Cats, Stearmans, or on other aircraft with exposed, full engines. Yes, I guess you could put two of these dummies together to form a full engine, but then you'd have two fronts and no back! If you need a full engine, buy the Williams Brothers* radial engine kits or cylinders, and make your own full-scale radial.

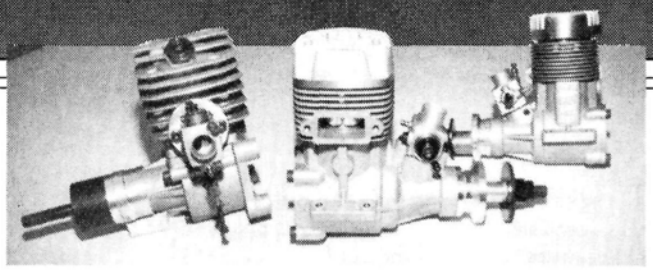
If you need something to fill that awful void in your empty cowl, I have just the ticket: look at the before-and-after photos of Jerry Bernard's Ziroli T-6. Two pictures are worth 2,000 words.



There's nothing worse than a huge, dark, empty hole in the front of your model. Jerry Bernard of Justice, IL, fixed the problem with an FTE dummy radial and a few pieces of aluminum tubing.

THE SMOOTH ONE STRIKES AGAIN

Nick Ziroli has been busy since Top Gun. You may remember that he flew Billy Steffes' wild B-25 at Top Gun and that he grabbed 2nd in Team Scale. The phones have been ringing off the hook: a lot of people want the plans. Nick has also just released the P-47 Thunderbolt, the first in his 72-inch scale models, and he's putting the finishing touches on the plans for a new



The long-awaited O.S. BGX-1 35cc engine will turn props for scale applications up to 20x10. It slurps up 24 ounces of fuel in 10 minutes and develops 4.1 horses right at 10,000, so be sure to prop it right.

Beech D-18 Twin that Billy has well underway! Mr. Z also has a 100-inch P-51 in the works! Before you deluge me with phone calls and letters, the Twin Beech spans 114 inches, it's 1/5 scale, and it should weigh in at 30 pounds. The 72-inch series of warbirds will all fly well with any .75 to .90 2-stroke engine.

TEUTONIC TWO-WINGER

If you want to see one of the prettiest biplanes of all times, take a look at the beautiful Heinkel 51 built by Chauncey Dance of Stamford, CT. Chauncey scratch-built this bird himself from Dick Murray plans that were blown up from the Repla-Tech drawings. It spans 72 inches and weighs a mere 16 pounds. An O.S. 120 Surpass turning a 16x6 prop provides the motivation for this outstanding aircraft. I think that Chauncey has proven, without a doubt, that you really don't need a heavy-metal fighter or a sophisticated jet to impress your fellow modelers. He doesn't have to hassle with retracting landing gears, gear doors and complicated struts, and he can enjoy the reliability of an upright engine. You must admit that this airplane has a lot of character.

It took Chauncey Dance one year to complete this HE-51, but the time was well spent. Excellent cowl and exhaust details. Light gray with red nose and black markings make it absolutely stunning!

BIG-BLOCK BULLY BEATER

I finally received my new O.S.* 3500 big-block engine. Using our famous formula, this 35cc engine packs 2.13 cubic inches. I took a photo of it sitting next to the Webra Bully, which is almost the same size, and next to the O.S. 108, which has about half the displacement. The workmanship on this unit is superb, and it bolts right into the same holes that you may want to kick your Super Tigre 2500 or 3000 out of! The instructions say that this engine has a range of 1,500 to 10,000rpm, and it likes to swing an 18x8 or a 20x8 prop. Like the Bully, the Zinger 18x6-10 will be the wood you'll like the most.

GLASSING MADE EZ

Our old friends at Aeroloft* are at it once again. They've already reinvented the wheel for the third time, and now they're providing us with a new and easier way to apply epoxy resin and fiberglass cloth to our models. They call it the Glass-EZ system.

Here's the deal: you buy the roller assembly for $13, or buy the entire glassing system for maybe $50, and then go to town. The detailed directions explain how easy it is to glass your wings or fuselage in minutes. Simply roll the resin through the glass-cloth with this special roller and presto!—you've finished. No, it won't work with polyester resin, because the special roller will disintegrate; and, yes, it will work with other high-quality epoxies like Pacer's* Z-poxy. It makes the task of glassing a Byro-foamer easy. That's why they call it EZ—right?

The secret isn't in the wrist! It's in the space-age compound used to make the roller! Aeroloft's new glassing kit works with its epoxy and with others as well. It's faster, neater, cleaner and easier.

At last, you can buy some good decal sheets for your modern jet fighters. Violett Supply*, a new division of Bob Violett models, has released a series of decals that are ideally suited to almost any air force or navy jet fighter or trainer. You can get scale-size numbers and letters, and the letter style is accurate for most jets. You can also order Top Gun badges, fin flashes and checkerboard trims. For $2, Violett Supply will send you a catalogue of all the decal sheets.

Jet fighter or trainer decal sheets are available from Violett Supply for only $10 each. You can also order scale numbers, letters, badges and placards.

TOP GUN NINETY ONE

Next month, I'll give you an in-depth look at some of the iron at April's Top Gun. I finally have some details for those who have been writing and call-

(Continued on page 111)

BELLANCA P-200-A

A scratch-builder's delight-classic scale on floats

by STAN RUTZ

When company politics denied Charles Lindbergh the Wright Bellanca WB-2, G.M. Bellanca missed his date with history. The Bellanca plane was flown nonstop to Berlin only two weeks after Lindy's second-choice Ryan landed him in Paris—but who remembers?!

A few months later, Bellanca's new company began producing the efficient aircraft that bears his name. Among the first was the 1928 model K "Roma," which was built to fly nonstop to Rome. The Roma was a single-engine, giant-cabin sesquiplane (monoplane-and-a-half). The plane's lower inverted-gull wing shortened the legs of the retractable gear at its apex, and its thick section housed the retracted wheel.

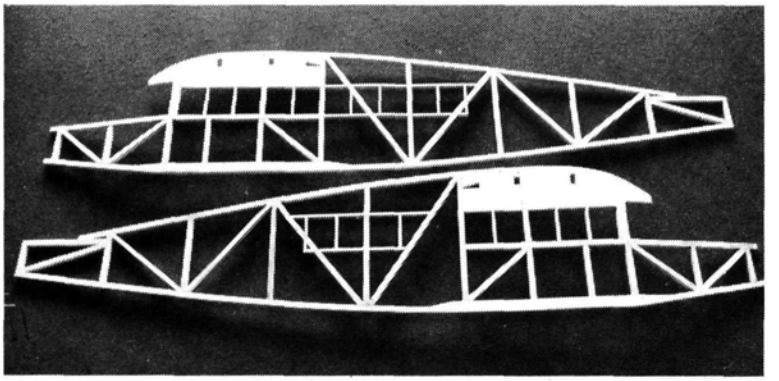
Outboard of the gear, the lower wing angled up to be-

PHOTOS BY STAN RUTZ

SPECIFICATIONS

Type: *1/12 sport-scale float sesquiplane*
Wingspan: *65 inches*
Weight: *5 pounds*
Area: *652 square inches*
Length: *42 1/2 inches*
Wing Loading: *17.7 ounces/square foot*
Power Req'd: *O.S. .20 or .26 4-stroke*
No. of Channels Req'd: *4 (minimum)*

P-200-A

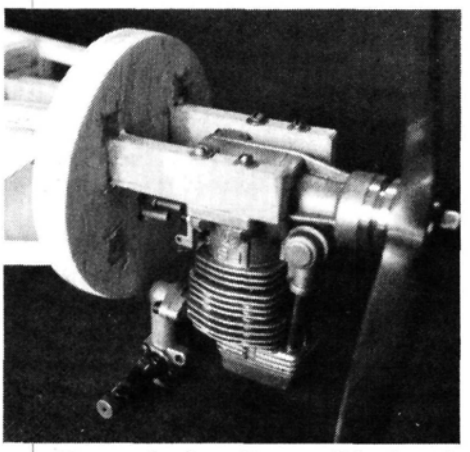


Right and left sides; nose sections swiveled; top longerons tapered. (Note windows no. 7 and 8 missing from right side).

come a lifting strut for the upper wing, the inboard section of which was sealed to carry fuel. Before it was ditched in the Atlantic on a New York to Oslo flight, the Roma inspired the Airbus, the Army Air Corps C-27 and the Aircruiser.

The sole P-100 Airbus demonstrator had the Roma's shape and dimensions. When its water-cooled Curtiss Conqueror engine was replaced by a 575hp Wright Cyclone, it became the first P-200, which flew the Mexican bush for Corporación Aeronáutica de Transportes.

With floats, the second P-200 was redesignated the 12-place P-200-A Airbus (our model). New York & Suburban Airlines used it to fly businessmen from Long Island to the Wall Street Skyport daily



Motor on hardwood bearers slides through stations A (laminated discs) and B.

from July 17 to September 28, 1934, when Federal regulations outlawed large, single-engine transports on U.S. airlines.

BILL OF MATERIALS

36-INCH BALSA STRIPS

- (2) 1/16 x 1/8 inch
- (6) 1/8 x 3/16
- (2) 1/8 x 1/4
- (7) 3/16 x 3/8
- (2) 3/16 x 1/2
- (14) 1/4 x 1/4
- (2) 1/4 x 3/8
- (2) 1/4 x 1/2
- (3) 1/4 x 1-inch aileron stock
- (4) 3/8 x 3/8
- (2) 3/8 x 1/2

36-INCH BALSA SHEETS

- (10) 1/16 x 3 inches
- (6) 1/8 x 3
- (2) 3/16 x 3
- (1) 1/4 x 3

MISCELLANEOUS

- (2) 2-ounce Hot Stuff
- 1 quart clear dope
- 1 pint aluminum dope
- (2) 3/8 x 5/8 x 6-inch hardwood motor mounts
- (1) 1/4-inch Foremost hinge
- 1 clear plastic sheet

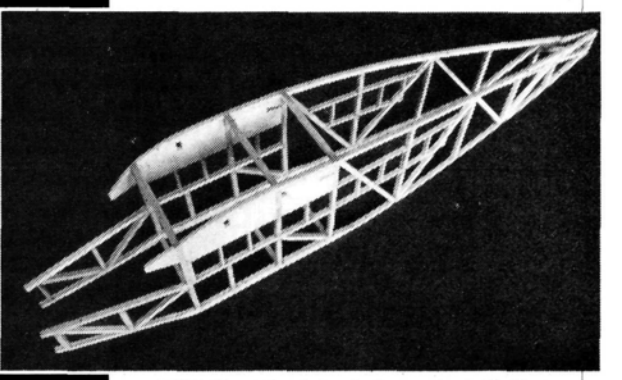
COVERING

- 2 1/2 yards of polyester chiffon "Fantasia" (or the polyester or nylon equivalent)
- 4 large tubes of Testor's *Extra-fast* glue

Refitted with wheels, the Airbus became a 15-place P-300 transport for Compañia Mexicana de Aviación. Because of the depressed economy, only four commercial and 14 military Airbuses were built. The "Aircruiser," which appeared in March of 1935, had to be sold abroad.

OUR MODEL

Early free-flight and 3-channel R/C models of the Airbus performed flawlessly, but the addition of ailerons brought problems, because they acted more like drag rudders. The



With the sides joined at rear, installation of cross-members begins.

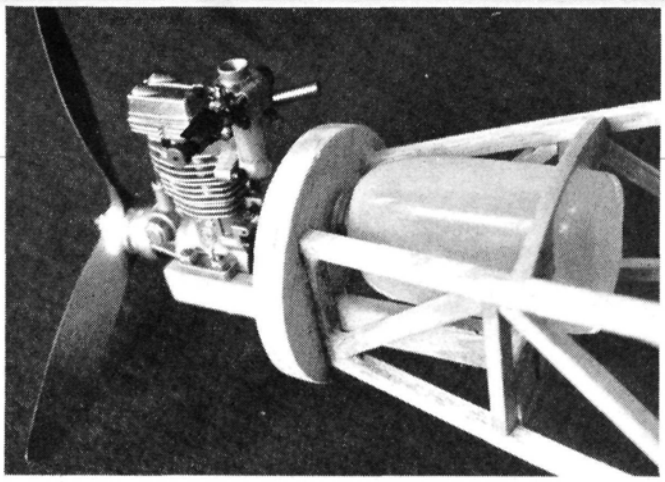
plane tends to turn in the direction of the *lowered* aileron, so down-travel must be limited. On later Bellancas, twin fin plates were added to improve stability.

With an O.S.* 20 4-stroke and a three-blade Tornado 8x6 prop, the model Airbus will take off from still water in dead air, but it uses much less lake if the surface is rippled by a light breeze. It flies and lands realistically, and it taxis without killing the engine. It survives spade landings, coming out upright and undamaged (as demonstrated on its first takeoff when it hit a wild duck!). The one-piece construction keeps the interior dry, even if you dump it onto its back.

CONSTRUCTION

• **Fuselage:** Build the left and right sides on the plan. Select hard balsa

P-200-A



Fuel-tank installation. The confines are narrow, but adequate.

of matching stiffness for the longerons, but taper the forward end of the upper longerons after assembly. *Do not* glue the oblique joints below the wing's leading edge. To establish the proper wing location and incidence, carefully align the spar and trailing-edge holes in the 1/4-inch sheet.

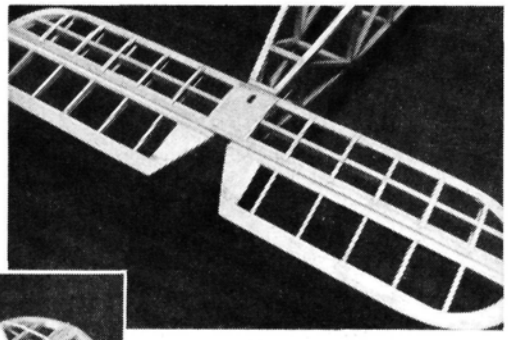
Add the 1/8x1/4-inch window frames; there are 10 windows (including the cockpit) on the port side and eight starboard. Starboard windows no. 7 and 8 were replaced by an odd-shaped bifold door that contains window 9. Window 10 is for the lavatory. Don't apply the rub rail.

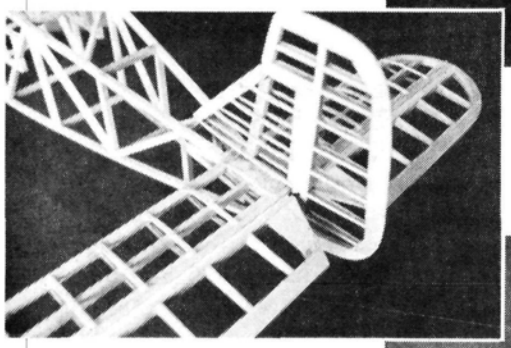
Remove the fuselage sides from the plan, "swivel" the nose sections (right and left) at the oblique joints to the angle shown on the top view, and apply CA. Stand both sides upright on a flat surface, and join their rear posts at the angle shown. Cut 1/4-inch-square cross-members, doubling the length shown on the top view, and install them front to rear. To keep the fuselage rectangular and symmetrical, check your progress often.

Make the three firewall circles (A) from 1/8-inch sheet balsa, alternating the grain and spacing the bearer holes to suit your engine. Align the holes, and glue the discs together. Bevel the 1/4-inch notches to fit the longerons, and glue the firewall to the fuselage sides using balsa-dust filler. Install the cross-members at (B).

Drill the hardwood motor mounts and bolt your engine to them. Slide this sub-assembly through the firewall, and align it to achieve a 0/0 (zero/zero) thrust line. Use 1/4-inch balsa to fill in around the mounts at (B), and glue them liberally at (A) and (B). Install a 4-ounce tank, and drill the firewall for vent and feed lines.

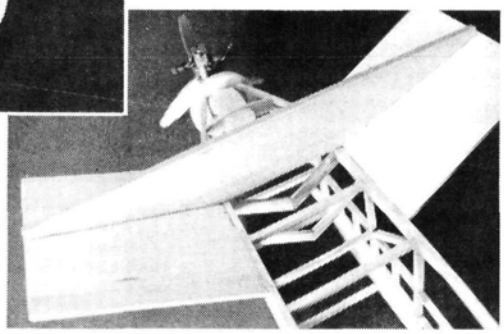
Add formers at (B), and cover the nose with 1/8-inch sheet balsa that has been soaked in ammonia and water to make it more flexible. Install the windshield-frame dowels. Add an 1/8-inch-square hatch-cover seat inside so that it's flush with the bottom of the longerons and cross-members that outline the radio hatch.



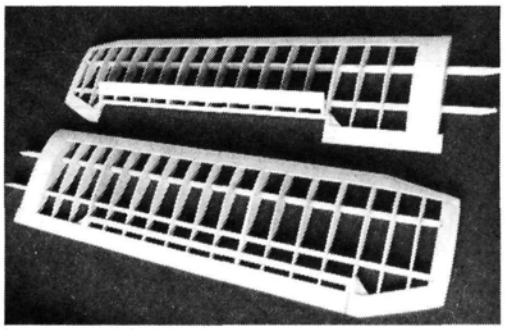


Above: Stab and elevators with Foremost hinge/spar. Clean workmanship.

Left: Fin and rudder with Foremost hinge; spar through stab.



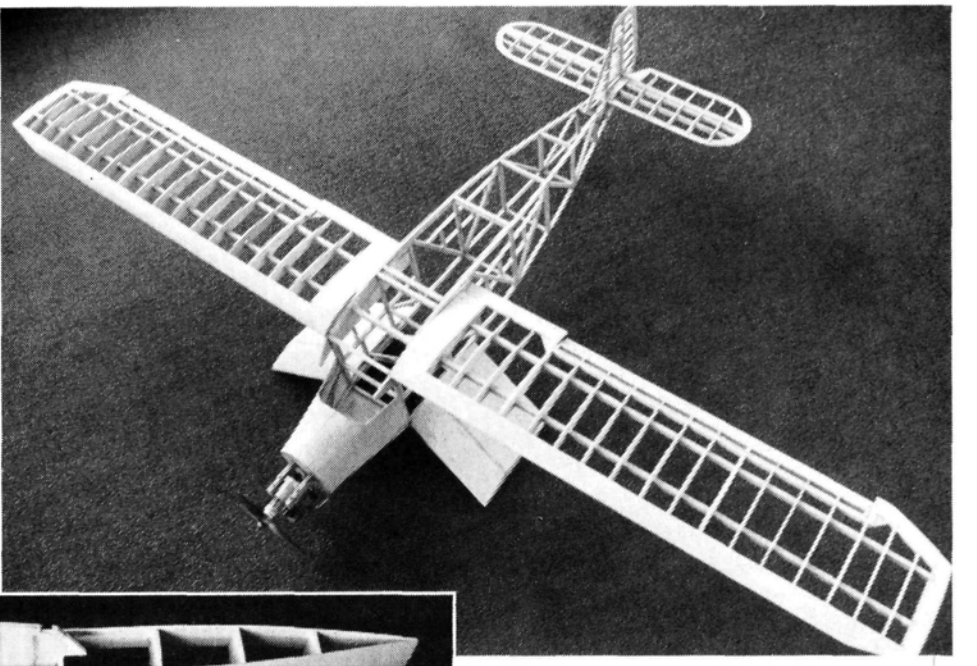
Stab-wing assembly jig glued to bottom longerons. Spars join at center.



Wing-spar ends sawed diagonally to join at fuselage center line.

• **Stub Wings:** Cut left and right bases from 3/16-inch balsa sheet. Roughly cut 3/16-inch ribs to fit the bases, and install them with the center rib perpendicular and the tip ribs slanted. Add leading and trailing edges, and cover the wing bottoms with 1/16-inch sheet balsa. Trim the ribs to a Clark Y section as shown on the plans, cut the spar slots, and install the spars. Make a 1/4-inch assembly jig, and glue it across the bottom longerons at the wing midpoint (as shown in the photos).

Slide the stub wings into the fuselage, allowing them to rest on the jig. To make the wing and fuselage bottoms flush, gradually trim and fit the longeron doublers under the spars. Cut the spar ends to meet at the center line, letting the jig establish the anhedral angle. Glue the wings to the fuselage and to each other, and cover their tops with 1/16-inch sheet. Add



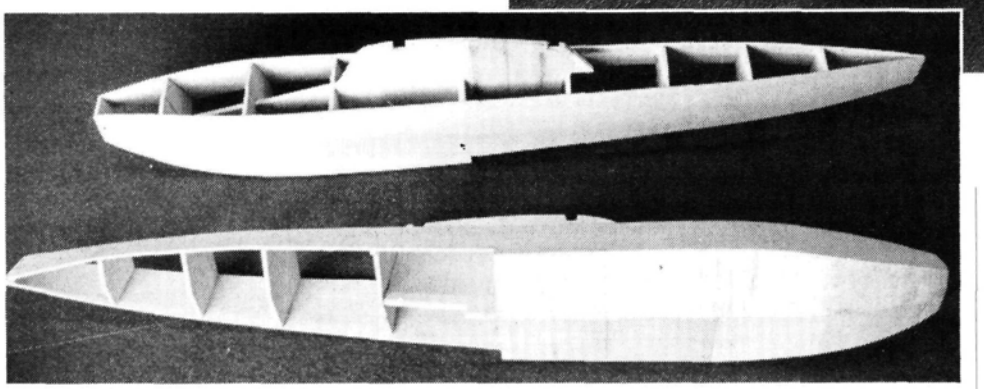
There's nothing like a beautiful classic before covering! Aero art form.

spar-joint reinforcements and covering-attachment fillers.

• **Horizontal Stab and Elevators:** To form two, 1/8x3/8-inch spars joined by a hinge, sandwich a Foremost hinge between four, 1/8x3/16-inch balsa strips. Center and glue the 1/4-inch-square rear-stab spar to the front side.

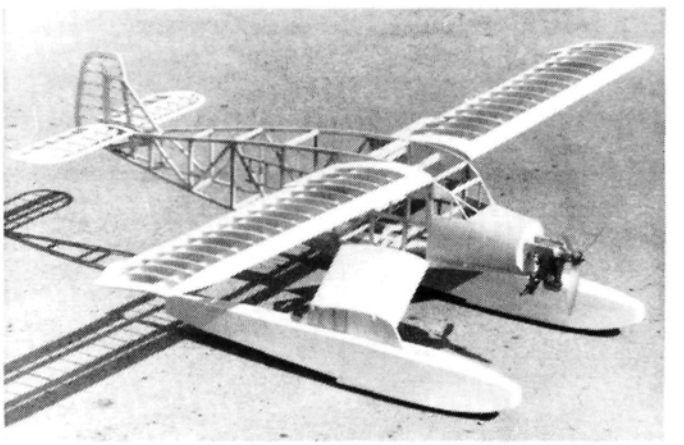
Cut the stab center section and tips from 3/16-inch sheet. Assemble the stab and elevator as a unit, and shim the 3/16-inch parts with 1/16-inch scrap. Mark the stab-rib locations on the spars. Off the plan, add the 1/16x1/8-inch stab ribs in sets, and bend them gently over the front spar. Cut out enough of the bottom center-section cover for the spars to be set into the longerons. Remove the hinge and *rear* hinge spar from between the elevators. Drill and slot the elevators for the 1/16-inch connecting wire, which can now be bent and installed.

Shape the tips and edges, and taper the spars to 3/16 inch. Notch the fuselage's stab-support longerons to seat the spars behind the front hinge-spar and flush with the longerons' ends. Install the stab horizontally and at right angles to the center line, and glue into place.



Floats assembled around the strut/keel. They're built like conventional fuselages.

• **Vertical Fin and Rudder:** Assemble hinge spars like those of the elevator, but make the front one using two, 3/16-inch-square balsa pieces. Build the fin and rudder as one unit; remove it from the plan to complete the fin ribs. Trim the 1/16-inch base cover to fit the stab's top. To provide clearance for the elevator wire, remove material from the hinge spar and hinge. Using CA, attach the fin to the center line perpendicular to the stab. Lay 1/8-inch sheet around the base of the fin spar in the fuselage's bottom.



Float strut/keels glued to stub-wing ends.

• **Main Wing:** Make an aluminum rib template, and cut 40 ribs. Band them together, sand, and saw spar slots. Build the right and left wings. Allow the spars to extend beyond the base ribs (as shown), and the trailing edges to protrude 1/4 inch. If you plan to incorporate ailerons, install the spars, and slant the leading edge 30 degrees to provide downward deflection clearance. Shape the wing tips, tip ribs and leading edge off the plan, and saw the ailerons free.

Hinge the aileron to the spar by covering its front side and the back of the spar with a strip of polyester covering material. Invert the aileron, so that its front is flush with the spar's back, and rub Testor's* *brown*-tube glue through the fabric.

P-200-A

Fold the hinge, depress the aileron to its fully "down" position, and cover the top of the joint in the same way.

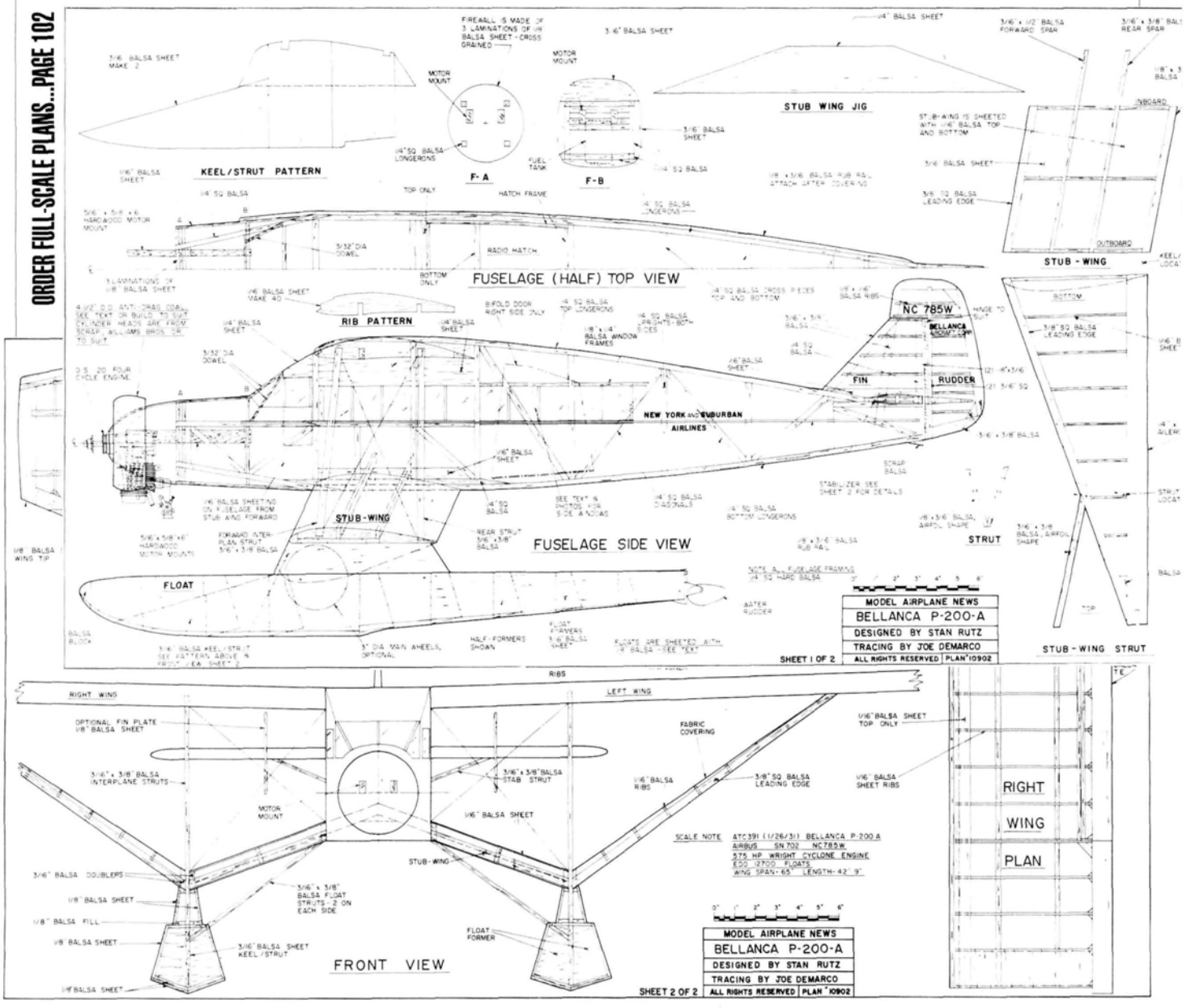
Place the wings end to end on a flat surface, and saw the wing-spar ends so that they mate when the base ribs are 5 inches apart (the width of the fuselage). Push the spars into the fuselage. Invert the model and put a 1-inch block under the center section, so that it spans both longerons. With the leading edge straight and both base ribs tight against the fuselage, make the wing tips touch the table.

Adjust the wings until, from a center line viewpoint behind the model, both stab tips appear to touch the edge of the wing simultaneously, and glue all joints. Cover the top and bottom of each wing's inboard bay with 1/16-inch sheet.

• **Floats:** Cut float strut/keels and formers from 3/16-inch balsa, and glue the formers to the strut/keels (five stations). Add 1/8-inch-sheet sides and the remaining formers, and glue the rears, maintaining symmetry. Apply the 1/8-inch-sheet tops and bottoms. Run the bottom grain crosswise, in front of the step. Align the top of the strut/keel with the top of the stub-wing end (the nose droops slightly). Make sure that the strut/keel is vertical, and attach it to the end of the stub-wing with CA. Align the second float with the first, and glue it.

Add water rudders, if desired. My system uses bellcranks and Golden Rods glued to the rear float struts; they're linked like strip ailerons to the rudder servo at one end, and to water-rudder carriers at the other. The aluminum carriers wrap around a brass tube on a staple-shaped wire, and

(Continued on page 116)



PHOTOS BY SAL IASILLI & MAT WOOLSTINOO

Judy holds the Falcon. Its beautifully sculpted fuselage and tail feathers and distinctive, upswept wing tips are complemented by its contest-winning performance.

Two years of R&D and a season of contest success lie behind this exciting new design. Is this the "ultimate sailplane"?

Rear view of the Falcon moments before touchdown—ailerons up, flaps down.

FALCON 880

by JUDY & SAL IASILLI

EVERY SO OFTEN, a new design that has everything going for it comes along. Mark Allen's Falcon 880 is just such a design. Two years of research and development and one season of success on the contest circuit have led to a huge demand for this sailplane, and this has resulted in a two-month delay on deliveries! What started as a sideline has turned into a three-man, full-time operation—Flight Lite Composites*.

The Falcon 880 was designed around the new, high-tech, computerized radios such as the 8-channel, Airtronics* Vision SP, which is made specifically for high-performance sailplanes, but I'm sure any good 4- or 5-channel radio with mixing capabilities will do.

The Falcon 880 boasts a fiberglass fuselage, Kevlar tail boom, carbon-fiber reinforced wing spars and Selig, computer-designed, wind-tunnel-tested airfoils (S-3021 on the main wing panels and S-3014 on the outer, upswept, wing panels). Upswept Schuemann wing tips are used to reduce drag, increase stability and maximize efficiency. These, together with its beautifully sculptured fuselage and tail feathers set the Falcon apart from the everyday type of sailplanes.

Although some have

FALCON 880

SPECIFICATIONS

Type: *Sailplane*
Wingspan: *112 inches*
Average Wing Chord: *7.86 inches*
Wing Area: *880 square inches*
Aspect Ratio: *14.25*
Airfoil: *S3021-S3014*
Stabilizer Airfoil: *NACA0009*
Weight: *3 pounds, 12 ounces.*
Wing Loading: *10 ounces per square foot*
Price of Kit: *Semi-kit $125; Complete kit $195; Deluxe kit $305 (all plus $15 shipping).*

The fuse is narrow, but still accommodates standard-size servos.

criticized the Falcon for being too small for an unlimited class sailplane, Mark Allen says its size gives it an advantage over others in its class on launching and landing. Because it's smaller and less prone to drag, at the top of a launch, it can accelerate instantly into air where thermals are usually found.

THE KIT

The kit is available in three forms:

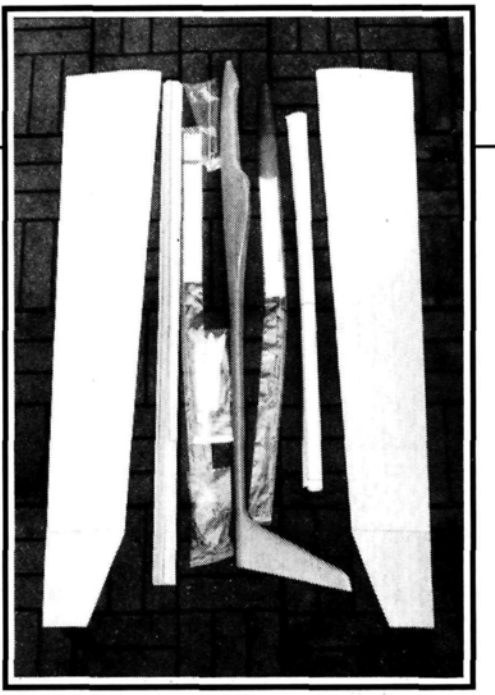
- Semi-kit, which includes an epoxy/glass fuselage; a pre-fitted canopy; machine-cut foam-cores made of 1.5-pound foam with full-size foam-core beds; and full-size plans.
- Complete kit.
- Deluxe kit, which is the one I review here. It has a pre-sheeted wing that includes carbon-fiber reinforced wing spars, 3-ounce fiberglass cloth on the upper and lower trailing edges, installed wing-rod tubes and channeling for the servo wires. The Deluxe version costs $110 more than the Complete kit, but you're guaranteed a perfectly accurate wing, which makes all the difference between a sailplane that flies fairly well and one with excellent performance.

The perfectly packed kit box contained: a lightweight, beautifully sculpted, epoxy/glass fuselage (reinforced with Kevlar from the rear of the wing fillet to the end of the tail boom) and a fitted, epoxy/glass canopy, together weighing only 6 ounces.

The wings, which were already sheeted with 1/16-inch contest-weight (light) balsa, are as straight as those on the expensive European F3B

sailplanes. Also included were balsa and hardwood, Sullivan cables and tubes, quick-link connectors, steel wing rods, four-pin Molex wing-to-fuselage servo connectors, servo extension cables and a set of well-detailed, full-size, rolled plans.

My only complaint is that the instruction manual wasn't available when my kit was shipped, so I had to call, long-distance, whenever I was unsure of a construction step. Full instructions will be available in future kits, and in this review, I discuss the problems I encountered.



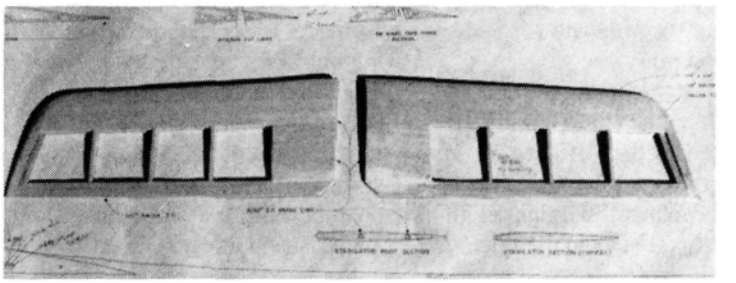
Layout of complete kit.

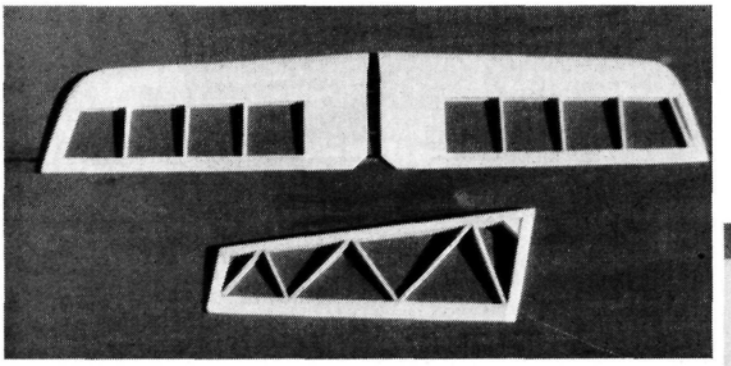
CONSTRUCTION

Anyone with a fair amount of building experience will have no trouble assembling this kit just from the information provided on the full-size plans.

Rudder, fin and stab. I started on what seemed to be the easiest part of the construction: the built-up rudder. This consists of a 5/8x3/8-inch balsa leading edge, a 5/8x1/2-inch trailing edge and 5/8 x1/8-inch ribs. I used thick UFO CA and spray activator and built on wax paper laid on the drawings. After that, I sanded the completed rudder to the illustrated shape. On one side, the rudder is hinged to the fuselage, so the leading edge is sanded at an offset of approximately 60 degrees. (This hinging procedure is usual on F3B sailplanes.)

Next, I cut out the vertical fin stiffener, which is shaped from 3/8-inch balsa and keeps the vertical fin aligned. When I trial-fit the finished rudder to the fiberglass fin, I realized something was wrong: the rudder was slightly larger than the fin, which was 3/32 inch smaller than the supplied drawing. I had to sand the top of the rudder until it was the correct size (just a minor alteration). Mark said he was aware of this problem and was correcting the drawings.

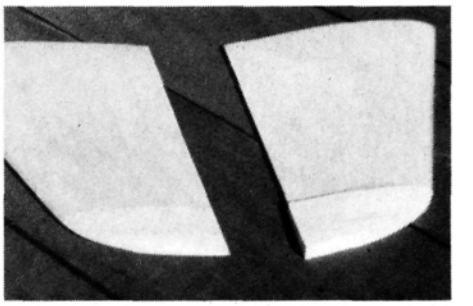




Above: Stabilizer and rudder are built directly over the well-illustrated drawings.

Left: Built-up tail feathers keep the tail section light and strong.

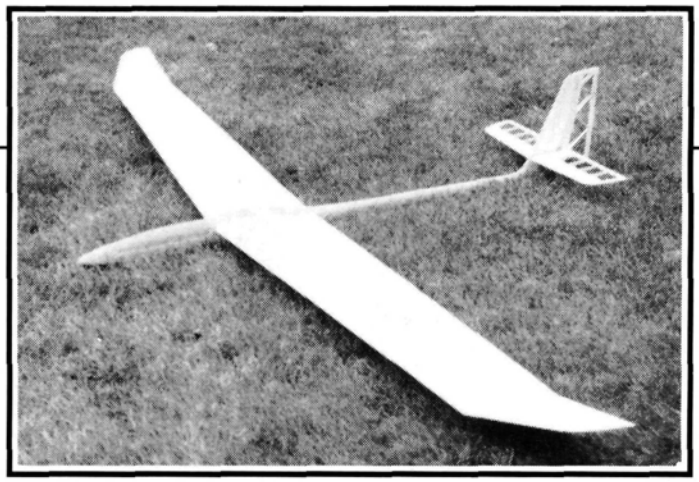
Below: Outer wing panels showing sanded and un-sanded wing tips.



With the rudder out of the way and the fin stiffener fitted, but not yet glued, I started to construct the built-up stabilizer. This consists of a 1/8x1/4-inch balsa leading edge, a 1/8x1/2-inch balsa trailing edge and 1/8-inch balsa ribs, which are built directly over the plans. The forward part of the stabilizer is sheeted with 1/8-inch balsa, approximately 1 1/2 inches on the upper and lower surfaces. The four 3/32-inch-i.d. brass tubes, which are used for the elevator horn pivoting pins, are carefully aligned with the drawings, sandwiched between the 1/8-inch sheeting and epoxied into place. This is followed by sanding to the stabilizer profile, which is clearly illustrated. Note that, although it isn't illustrated, the three 1/8-inch balsa ribs need balsa cap strips to accommodate the airfoil in the open bays between the sheeting and the trailing edge. This is followed by gluing and shaping the 1/4-inch balsa tips.

Wings. Although the wings arrive sheeted, there's still a fair amount of work to do. Using white glue, I joined the 1/8x3/8-inch basswood leading edge to the sheeted foam-cores, holding it in place with masking tape until the glue had dried. Then I carefully sanded the leading edge to conform to the airfoil cross section, as illustrated on the drawings.

To avoid scoring the surfaces of the sheeted wing-cores, I used 1-inch masking tape just behind the 1/8x3/8-inch basswood trailing edge. When the leading edge was close to the tape and shaped to the templates, I removed the tape and sanded the leading edge flush with the wing sheeting. It's very important to maintain the true airfoil shape for optimum performance. The outer tip plane is done in the same manner, and this is followed by the shaping and sanding of the wing tips. Because the trailing edge on this airfoil is extremely sharp, you have to laminate the lower part of the wing tips with 1/64-inch plywood. The balsa alone is much too soft to support the

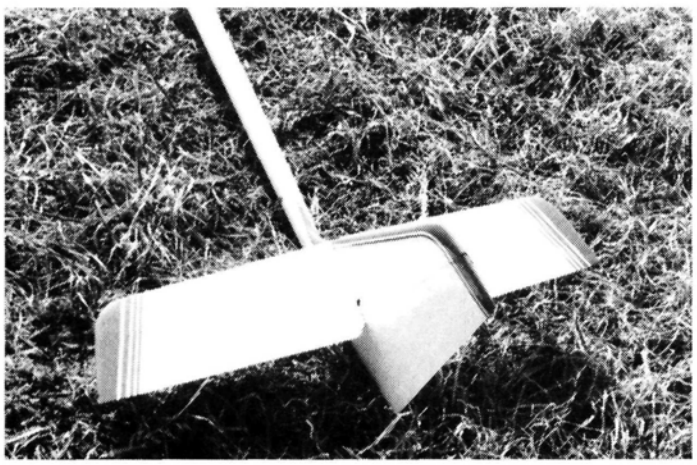


The clean lines of the Falcon before it's covered.

required edge sharpness.

Now carefully align the pre-shaped 1/8-inch plywood wing root with the inside wing panel. The plans show a cross section of the root with the wing-rod hole, wing-alignment pin and servo plug. (This is just for reference.) Make a paper template and align it to the wing sheeting and the 3/8-inch-o.d. brass tube. Take the time to align the paper template before you make the actual cutouts on the 1/8-inch plywood wing root. When you've aligned the wing root with the openings, epoxy it into place. When the epoxy has set, sand the wing root flush with the wing sheeting and fill with wood putty.

Next, sand the trailing edge to the sharp angle illustrated on the airfoil drawings. Since the trailing edge has 3-ounce fiberglass cloth epoxied between the upper and lower foam-cores, I was able to sand the trailing edge until it was sharp enough to reveal the epoxy/glass cloth at the extreme tip of the trailing edge. The epoxy-glass cloth under the balsa sheeting maintains a surprisingly straight, sharp trailing edge.



Finished rudder and stabilizer accented with a sleek trim design.

Now cut the ailerons and flaps from the balsa and foam-cores. I used a simple, but accurate, procedure for the cutouts: I measured three sections up from the trailing edge, taped a straightedge ruler to the opposite side of where I planned to cut and then lightly scored a line with an X-Acto knife using a no. 11 blade. I repeated the scoring until I had penetrated the fiberglass cloth under the balsa skins, and I did the same for the wing's undersurface. Repeat this cutting procedure for the flaps and ailerons, and allow for the spacing of the 3/32- and 1/8-inch capping.

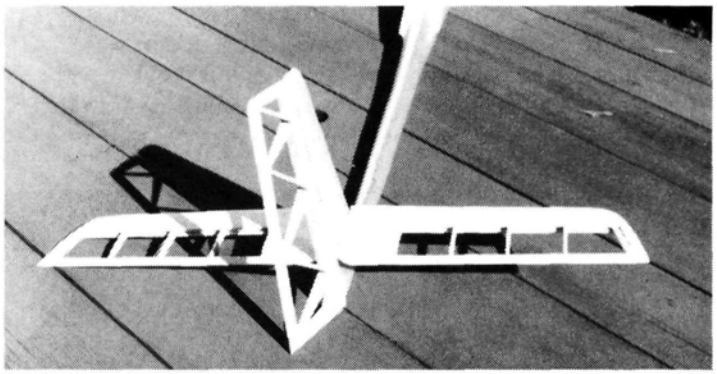
Instead of making the 1/16-inch control horns of plywood, I cut mine from 1/16-inch fiberglass phenolic. Readily available at electronic supply stores, phenolic is basically the material used to make printed-circuit boards and it's much more durable than plywood.

Sand the outer wing panels to accommodate the 1 3/4-inch dihedral, and then epoxy them into place. When asked, Mark said that epoxy and Mylar covering were enough to ensure a strong joint.

Servo installation. When I had final-sanded the wing to a satisfactory finish, I cut open the pre-marked servo cavities for the aileron and flap servos after measuring their exact locations on the drawings. Airtronics micro 401 servos are recommended, but I couldn't find four, so I settled for Futaba 133s for the ailerons and Airtronics 401s for the flaps.

The kit includes a four-pin Molex connector that's used to plug the wing servos into the fuselage. I was a little confused because I had six wires coming from two servos and only four pins on the connecting plugs. Mark clarified the situation as follows: the two positive wires from each servo are soldered to one pin, and heat-shrink tubing covers the exposed wire. The second pin gets the two negative wires from each servo (soldered in the same way). The third and fourth pins accommodate the signal wire from each servo. This unique system might seem complicated, but it's really simple: Mark uses a four-pin rather than a six-pin to keep size and weight to a minimum.

The fiberglass fuselage. The kit comes with a 1/8-inch ply elevator horn, which I replaced with a stronger one made of 1/8-inch phenolic. Carefully align the horn with the drawings, and epoxy the two plywood supports that accommodate a 3/32-inch-i.d. brass tube. Make sure the horn alignment and movement are non-binding and slop-free.



The rudder is hinged on the left side only. This is common on F3B sailplanes.

The kit comes with Sullivan* 36-inch braided cables and tubes, but you'll need 42 inches for this fuselage. Shape a foam block to the diameter of the fuselage center section, and drill two holes through it. Then install it in the fuselage center section to prevent the two control tubes from flexing. Also, epoxy the control tubes at the rear of the fuselage and

(Continued on page 66)

FALCON 880

(Continued from page 64)

at the opening of the canopy hatch as shown on the plans. I substituted 1/16-inch music wire for the braided cables, but I used the inner tubing, and this worked out well.

Just above the CG mark, make a cutout for the access hatch. Carefully cut to the dimensions shown on the drawings, and then cut a 1/16-inch ply piece as the opening door.

The next step is particularly important. The wing root must be perfectly aligned with the cutouts already mentioned, the wing rods (front and rear), the servo plugs and the hook release for the wing joiner. The pattern that was used for the wing root will also be used for the wing root on the fuselage. When you're satisfied with the alignment of the wing with the fuselage, trial-fit the steel wing rod through the fuselage and slide the two wing panels to meet it. When you have the perfect fit, working through the access hatch, you

(Continued on page 68)

(Continued from page 66)

epoxy the brass tube that accommodates the wing rod into the fuselage. Follow the same procedure with the wing-alignment tube. This alignment is very important on any high-performance sailplane. Take your time, and *do it correctly.*

FINISHING AND COVERING

After careful preparation, prime the fuselage with a good primer-filler spray. (I used Rustoleum, light gray, auto primer.) Final-sand the primer with 400-grit sandpaper and paint the entire fuselage with Formula-U* urethane spray paint followed by the trim, for which I used Chevron* urethane. I covered the wings, stabilizer and rudder with MonoKote*.

The plans recommend the use of 3M vinyl tape to hinge the ailerons, flaps and rudder, but when I tried it, I thought the tape was expanding and contracting too much with temperature changes and causing the control surfaces to "lose" their centering. Instead, I used the iron-on, gapless hinges that were described so well in the March '90 issue of *Model Airplane News.*

When I trial-fit the canopy hatch, my servo arms rubbed against the sides of it. When I initially installed the servos, I didn't realize that the ones shown in the drawings were slightly smaller than the ones I used. To solve the problem, I only had to move the two servos closer (approximately 1/2 inch) to the fuselage center.

Four to six ounces of nose weight is recommended. This was a new ship, so I decided to play it safe and use the forward CG as my starting point (approximately 1/2 inch forward of the aft CG point). This required 5 1/2 ounces of lead pellets in the nose, and I hold these in place with a wall of 3M Scotch Seal sealant, which remains pliable indefinitely, so it will be easy to remove the pellets if I ever want to.

The plans don't show where you should mount the tow hook, and the kit doesn't include one. I bought a heavy-duty Airtronics hook, and Mark advised me to mount it directly under the CG

The kit doesn't contain decals, so I had some custom-made by Vinylwrite*—1/2-inch words and numbers with a forward and backward slant. These are a nice finishing touch.

THE FALCON FLIES!

Although it isn't specified on the drawings, Mark recommended the following control-surface throws:

- The rudder should use approximately 20 degrees right and left throw.
- The stabilizer: 10 degrees up and 10 degrees down.
- The ailerons: 30 degrees up and 12 degrees down.

For launching, Mark recommends 1/4 inch down on the flaps and 1/8 inch down on ailerons. For landings (which are in the "crow" mode), flaps are 90 degrees down and ailerons are 25 degrees up.

With my radio programmed as Mark had recommended, I was ready for the initial test flight. After

(Continued on page 93)

■ *Above: Despite the sometimes stiff onshore breeze, a large group of float fliers from Long Island gathered for the fun fly.* ■ *Left: A very pretty A&A Citabria. There were a lot of scale subjects at the event!*

■ *Left: Note the twisted tail group on this Indy Clipped Cub; the damage occurred during retrieval. Big airplanes can be unwieldy!* ■ *Above: Always a favorite, the Cub on floats is a graceful flier.*

R/C Seaplanes over Long Island

Blue skies, blue water and a lake called Ronkonkoma

An attractive, Seamaster-like amphibian is fired up and prepped for launching.

by FRANK GUDAITIS

THERE'S SOMEthing very appealing about flying off water, especially when the weather cooperates. When the Local Independent Fly-Together Society (LIFTS) held its annual "Float-Fly-In and Fun-Fly" at Lake Ronkonkoma, Long Island, NY, last May, the weather was great and so was the turnout. About two dozen scale and non-scale floatplanes were entered. Some were flying boats, but the majority rode on floats. Members of the Suffolk Wings, Wing Nuts, IMPS, Suffolk Aero Modelers and the Nassau Flyers also participated in the event.

The competitive events were divided into two main categories. In the first, several flight maneuvers were offered, and each contestant had to choose five. A loop, a roll, a split-S, a stall turn, a figure-8, an Immelmann turn and a procedure turn were good for 20 points each. More difficult maneuvers, i.e., the outside loop, the inverted flight and the avalanche were awarded 30 points. A "Top Hat" won 40 points and a 3-turn spin, 50 points. These were followed by a touch-and-go event and a spot-landing event—each for another 100 points.

The second category was a timed-loop contest with 10 points awarded for each loop, and 15 points awarded for each outside loop performed within 1 minute.

Bob Brassell finished in 1st place with his Ugly Stick, Lewis Schwab placed 2nd with a Lucky Stick, and Tom Hunt was 3rd with his Hammer 20. Manufacturers donated kits, radios, floats, and various accessories for the winners.

The brisk northwest wind caused problems for some of the smaller floatplanes. There were a number of spills, but in most cases, the damage was minimal, although Joe Day's clipped-wing Cub lost its tail section while it was being towed by the rescue boat. It was an enjoyable day for the contestants and for the large group of spectators. The formula was simple: H_2O+R/C = fun for everyone. ■

FLOATING AROUND

Diet programs, kit evaluation and Savoia progress

by JOHN SULLIVAN

Jack Kostelic displays his A & A Citabria on 44-inch Sullivan floats. This lightweight ship is an agile, yet forgiving, performer.

THERE'S ALWAYS SOMETHING new at the pond, and this month is no exception. I have reports on three new floatplanes!

Gary Gleffe recently brought two speedsters and they were as different as night and day! The first, an Ace* Mach None, is powered by a throttled .074 Cox* Queen Bee. The Mach None is intended for hand-launching with an .049 for power in its land-based version. Gary inverted the rudder on his float adaptation for both air and water steering, and this arrangement works well. He uses a standard Futaba* receiver, Futaba mini-servos and a 150mAh battery to keep the weight down.

The float gear was made using music wire that was smeared with a coat of epoxy and then poked into the foam floats. The floats are bare foam, and the airframe was covered with Econocote to avoid having to sheet the foam wing. Without fuel, the Mach None weighs 30 ounces.

Gary hand-launched the Mach None without floats and discovered that it was a real "streaker"! With floats, it's still impressive and will do respectable pattern maneuvers, but its speed drops off on verticals. The Queen Bee may not reach high speed ranges, but this combo still has benefits! There's a lot to be said for arriving at the lake with two handfuls of plane and support equipment and spending the day darting around the big guys!

THE CALYPSO

Gary's second plane is not the kind of plane to dart in front of—it's a .60-size, almost-ready-to-cover (ARC) pattern plane called the Calypso. Gary upgraded it by installing a Webra* Speed .90 with a Mac's* Tuned Pipe. This floatplane cooks! Gary bought the plane second-hand from a hobby shop, and he cut his own foam floats using a band saw (to get the basic shape) and then rounded the tops by sanding them.

Slamming the Calypso's throttle produces instant terror! There's no "hump-transition phase" with this plane—it blasts out of the water at the same angle it has in the displacement mode! On its only outing to date, Gary flew the Calypso three times, and each flight had everyone watching! Halfway through its third flight, it came out of a dive and started to buzz like a high-power line transformer that's about to blow. Gary landed it quickly and discovered that all six aileron hinges were loose and the torque rods had worn a 3/8-inch i.d. hole in the wing roots.

Gary Gleffe squints to inspect the linkage on his .074-powered Ace Mach None. The .90-powered Calypso (foreground) is a real screamer! Both planes are equipped with MAN design floats.

The Calypso is back on the bench for post-flight stress analysis. I hope Gary fixes it properly or, next time, it might blow up in midair!

THE CITABRIA DIET!

Like Gary's Calypso, Jack Kostelic's A & A* Citabria was bought used.

In its original form, the Citabria had been fabric-covered, painted and powered by a gas burner. Jack added 44-inch Sullivan* floats and a Zenoah* G38.

The Citabria weighed 21

pounds, and Jack found that its performance was sluggish and its aerobatic capabilities poor. He also realized that the Citabria kit was designed to be flown with a .60 engine, and that the aircraft's weight was threatening the airframe's integrity.

Jack's solution was to strip off the covering, re-cover the plane with MonoKote and substitute a Saito* 1.2 4-stroke for the G38. Additionally, Jack used scraps of 1/64- and 1/16-inch plywood to strengthen the frame with gussets and webs at the strut points, fire wall, upper cabin and gear-attachment areas. The revisions reduced the plane's total weight (including the floats) by 6 pounds!

Weighing only 15 pounds, the Citabria is a sterling performer. Its takeoffs are effortless, and its landings are as light as a feather. In flight, the plane responds immediately, but not drastically, to input, and this results in snappy, calculated maneuvers. At 21 pounds, it seemed as if the Citabria had a mind of its own: swinging wide in turns, rolling with considerable yaw, staggering inverted and struggling over the tops of loops. Now that the plane has "found its wings" and does what it's told to do, it's an absolute joy to fly!

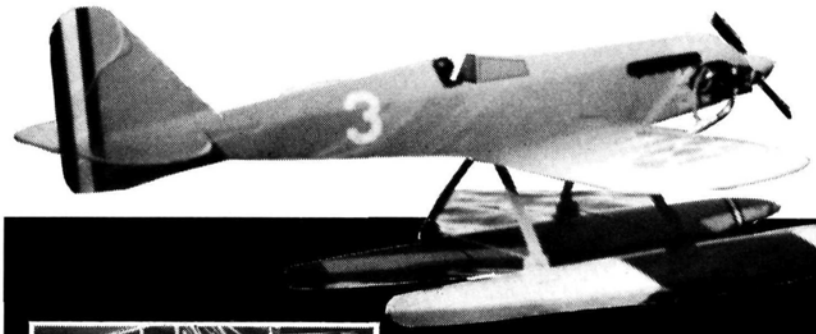
I'm reminded of the diet ads that say, "I lost 117 pounds and I feel great!" Jack Kostelic's weight-loss program for the Citabria was difficult, but well worth it. What a difference!

THE NEW SCHNEIDER SPORT .60

Ed Westwood has the new Schneider Sport .60 by Stream Inc.*, and he sent me a review taken from Ed and Charley Chamber's "Northwest Float Flyer*". Tom Strom built this particular Stream/Schneider and, covered with electric-blue Supercoat by Maria Bergstrom, it took 2nd Best Seaplane at the Puyallup Expo. The Schneider Cup look-alike has a 600-square-inch wing with a 15-percent semi-symmetrical airfoil. The 34-inch molded ABS floats are made for Stream by Lanier* and have a "splitline" around the chine, which is totally sealed. The floats have the step located at 53 percent of the hull's length and are slightly vee-shaped.

The Citabria on a flyby. This "floatplane for-all-seasons" is powered by an inverted Saito 1.2 and covered with MonoKote.

The test ship weighed 7 pounds, 4 ounces with a Saito .80 up front for a 28.8-ounce wing loading. Ed found that the Schneider taxied better at speed with a slight-aft stick.



Stream Inc.'s Schneider Sport .60 taxis out for a flight. (See text for Ed Westwood's evaluation.)

Bob Hodgin's Sig Cub on scratch-built, scale, Edo floats is accurate down to the last bolt!

THE FLOATING MAILBAG

I received a call from Jim Traxler of Exline, IA, about float sizes for a giant Balsa USA* Stik he was scratch-building. Later, Jim dropped me a note and pictures of his Stik on 48-inch Sullivan floats at the Higginsville Float Fly. Trying to keep its weight to a minimum, Jim glued plywood plates on the float deck, step wall and stern, and then drilled holes into the foam for 3/8-inch epoxied dowels. With the hard-points installed, he finished the floats with a couple of coats of latex paint, and that was it!

Jim successfully flew the Stik at Higginsville, but he said that people with smaller planes didn't do as well—the wind was blowing in excess of 40mph! Jim reported that everyone enjoyed Higginsville (despite the wind) and that next year they'll fly twice as often to make up for the lost time.

Jim's Stik is powered by a Quadra* 35. If you look closely, you can see an Ace All Star powered by a Fox* .19 huddled under the Stik's big wing.

With full throttle, the ship took off in 100 feet (with no wind). The Schneider handles speed well and flies like a pattern ship, tracking straight through loops and rolling at 720 degrees per second. Ed's only criticism was that the Stream/Schneider has no water rudder. This wasn't important during the test because it was a calm day, but for reliable, all-weather performance, a drop rudder could be installed off the air rudder.

For those willing to go the extra mile, look at the Savoia rudders in the article on fiberglassing foam floats (elsewhere in this issue). Both the Savoia and the Stream floats have canoe sterns and the hinging (shown) works well.

I'll end here because I need more time to work on the Savoia! Who knows?—there might be pictures of the finished plane in the next issue!

**Here are the addresses that are pertinent to this article:*

***Ace R/C, Inc.,** 116 W. 19th Street, Box 511C, Higginsville, MO 64037.*

***Cox Hobbies, Inc.,** 1525 East Warner Avenue, Santa Ana, CA 92705.*

***Futaba Corp. of America,** 4 Studebaker, Irvine, CA 92718.*

***Webra/United Model Distributors,** 301 Holbrook Dr., Wheeling, IL 60090.*

***Mac's Products,** 8020 18th Ave., Sacramento, CA 95826.*

***A&A Industries,** Hwy. 60 N., Sibley, IA 51249.*

***John Sullivan Model Floatplane Products,** 1421 2nd St., Calistoga, CA 94515.*

***Zenoah/World Engines,** 8960 Rossash Ave., Cincinnati, OH 45236.*

Saito/United Model Distributors.

***Balsa USA,** P.O. Box 164, Marinette, WI 54143.*

***Quadra Aero Engines,** Box 189, Agincourt, Ontario, Canada..*

***Fox Manufacturing Co.,** 5305 Towson Ave., Fort Smith, AR 72901.*

***Stream, Inc.,** 815 Blue Crab Rd., Suite C, Newport News, VA 23606.*

***Northwest Float Flyer,** 909 South 173rd St., Spanaway, WA 98387.*

***Lanier R/C,** P.O. Box 458, Oakwood Rd., Oakwood, GA 30566.*

***Schneider Cup News,** 1520C Acoma Ln., Lake Havasu City, AZ 86403.* ■

Sullivan and Johnson hot-wire one of the Savoia's wing panels. Note the numbered stations on the aluminum chord template. Coordination is a must.

SCHNEIDER CORNER

In July, The Schneider Cup Association and the Desert Hawks R/C Club published Issue No. 1, Volume 2, of the Schneider Cup News*. There are four pages of news, updates, changes in rules, entry information and a call for judges. The newsletter also has an updated list of references (including libraries in the U.S. and Italy), a complete list of entrants from 1913 to 1931, a contest entry form, and finally, a very nice exposition of Thomas Foxworth's "The Speed Seekers" (with ordering information).

I've also received notices from the Desert Hawks about booth reservations, Fun Fly entry forms, and hotels and motels in the area. Don't forget, this extravaganza is held during two weekends. The Schneider will take place on November 2, 3 and 4, and the Float Fly will be held on November 10, 11 and 12. Frequency control at both events will be the same as at the Byron and Ace Fly-Ins. Flight stations at the Fun Fly will be assigned by badge number so that all the participants will have an equal opportunity to fly.

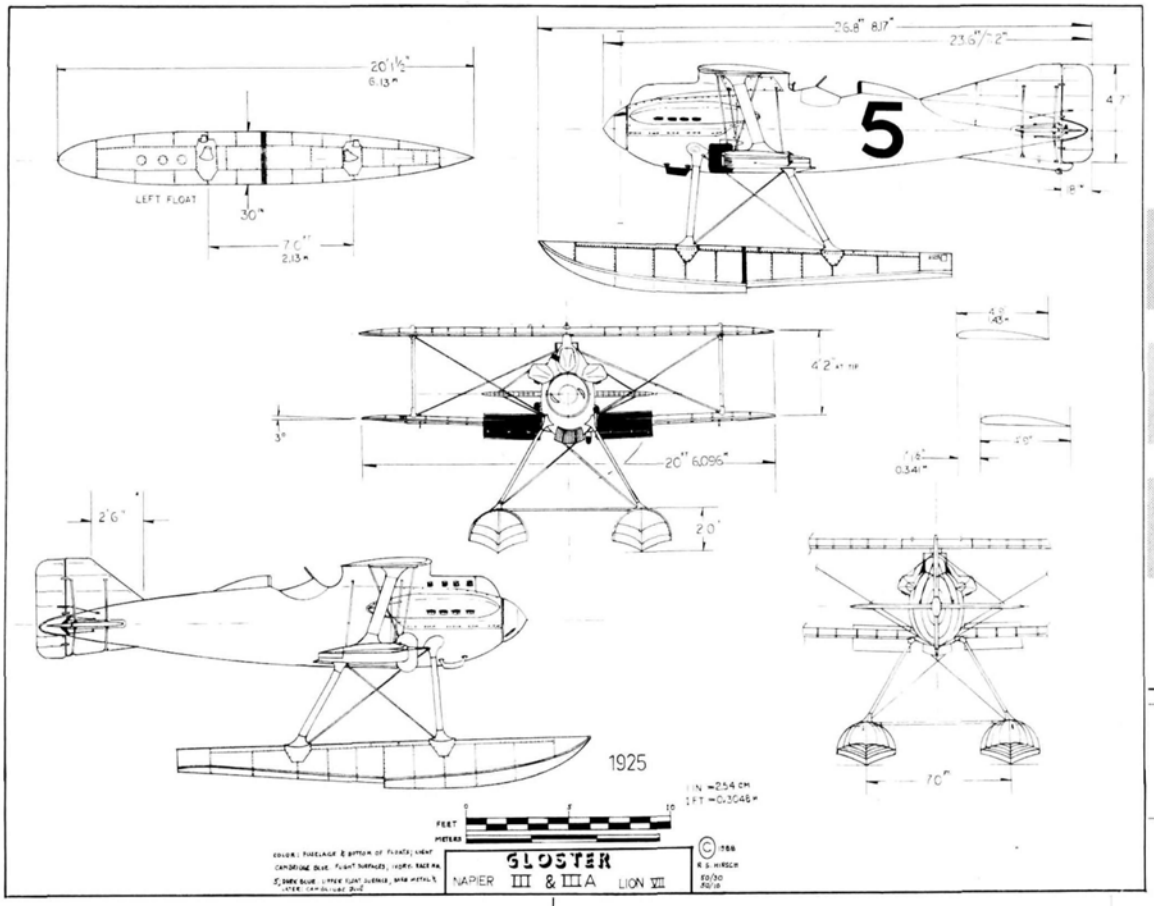
PROGRESS REPORT

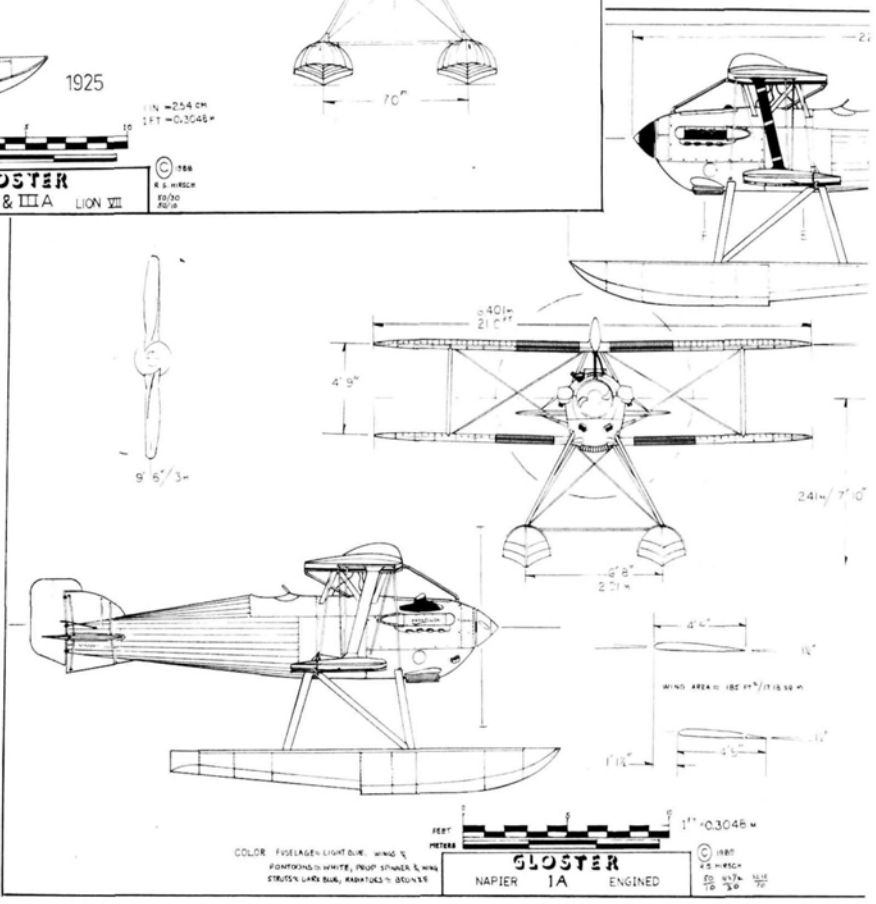
The Savoia floats are ready to mount and prime, and Mike Johnson has almost finished machining shaft couplers and prop hubs. With the pod and the floats almost finished, we're concentrating on the flying surfaces and struts. We discussed our concerns about the Savoia's reputed pitch instability with Fred Constantine, and he helped us by picking an airfoil and plotting it on his computer.

The airfoil is an NACA2R112, with a 2-percent camber and a 12-percent thick section with a very mild trailing-edge reflex, or upsweep. The semi-symmetrical airfoil looks like something seen on a flying wing. Fred concurs, adding that the horizontal stab can be considered a pitch stabilizer when used with this section. At 25-percent scale, the Savoia's wing will be $1^5/8$ inches thick by 14 inches deep and have a 7-foot $8^1/2$-inch span. After we've installed balsa leading and trailing edges and plywood/carbon fiber spars, we'll sheet the wing with $^1/16$-inch balsa.

We had a setback while trying to locate aluminum tubing for the booms and main and stern struts. Alcoa makes it in the sizes we want, but all its distributors as far east as Denver were out of stock, or wanted a $200 minimum order! We've decided to make the main booms of glassed foam and to melt the foam out with gasoline after curing it. The main struts will be cedar, coupled to aluminum ends and glassed, while the stern struts will be streamlined cedar. That's enough to occupy us for the moment!

Down the road (river?), we have to make the empennage, assemble the plane for test flights and then take it apart for painting and detailing. I hoped that we'd have the Savoia flying three months before the contest, but that's out of the question! What is it they say?—95 percent completed, and 95 percent to go!





A GIFTED ILLUSTRATOR WITH AN OBSESSION

by JOHN SULLIVAN

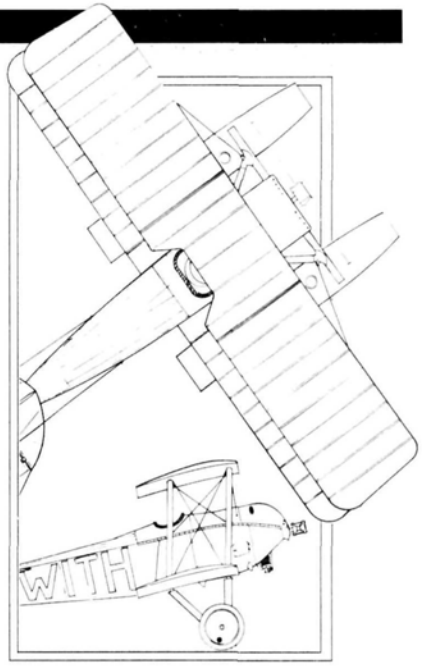
HISTORIANS ARE A dedicated lot. They preserve the record of our past for the benefit of future generations. It's a mind-boggling job.

For the last 23 years, aviation engineer and former test pilot Robert Hirsch has been occupied (some say possessed) with this passion to preserve. It started when a friend gave him a plastic modeling kit. Bob built the kit (and several others thereafter), but it wasn't long before he focused on the plans and the three-views. He decided to prepare a catalogue of detailed drawings of one-off planes, with an emphasis on race planes. This was quite an undertaking, when you consider that most of these planes were made in small workshops that flourished and then disappeared along with the men who built them.*

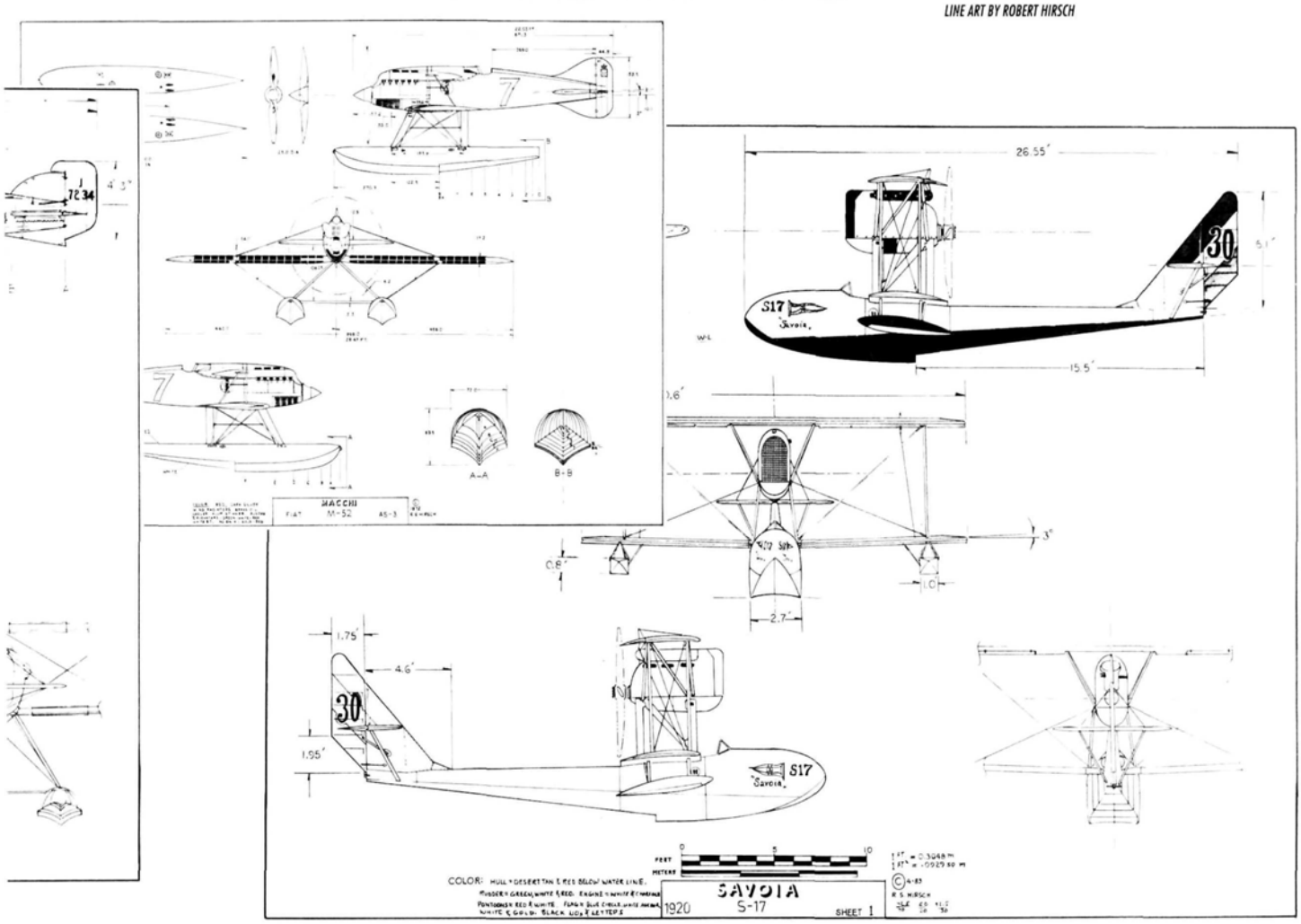
Over the years, Bob has collected over 16,000 photos of famous, obscure race planes, engines and miscellaneous gear. He has corresponded with museums, aviation experts and relatives of deceased pilots and builders from all over the world. He has accumulated over 4,000 hours of flight time in everything from P-51s to F84s. His accomplishments (nearly a quarter-page long) appear in the U.S. edition of Jane's Who's

Robert S. Hirsch and the

SCHNEIDER TROPHY RACERS



LINE ART BY ROBERT HIRSCH



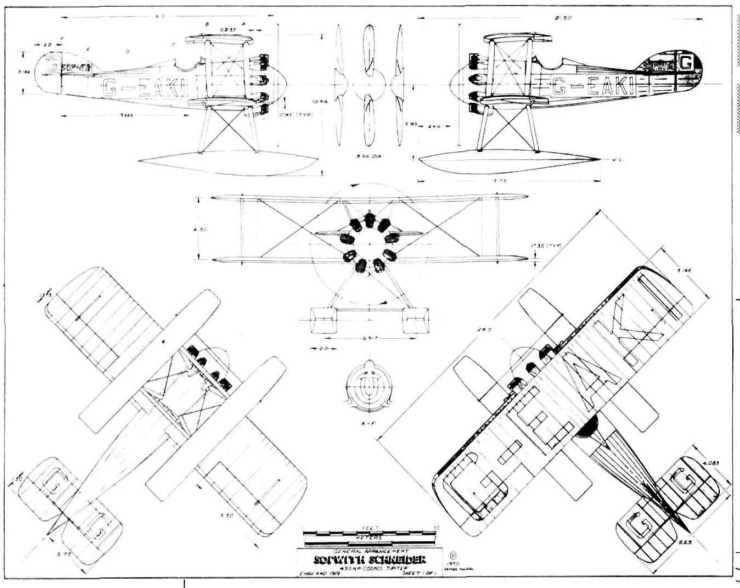
Who In Aviation and Aerospace.

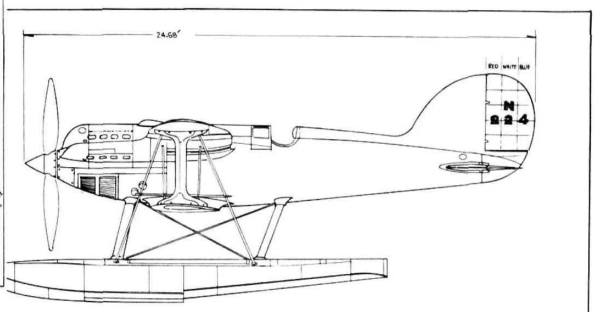
With the recent interest in Schneider Trophy Planes, Bob has focused on the floatplane world. To date, he has completed plans with a minimum of five views each on 31 of the planes that competed in the Schneider Races between 1913 and 1931. With Bob's permission, we're presenting side views of these famous racers for this, our fifth annual special floatplane issue. As a co-builder of the Savoia Marchetti, I can tell you that Bob's drawings were indispensable to the model's construction; so feast your eyes, pick a favorite, and maybe we'll see you on the flight line at Havasu in 1991.

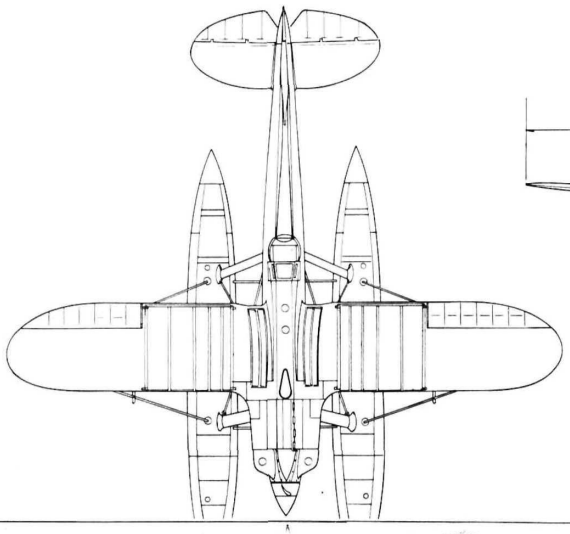
**The Catalog of Race Planes and Scale Drawings is available from R.S. Hirsch, 8439 Dale St., Buena Park, CA 90620.* ■

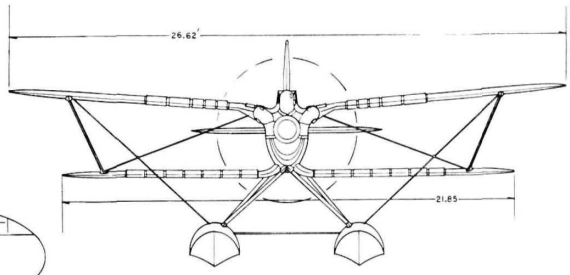
More Illustrations on the next page

SCHNEIDER TROPHY RACERS

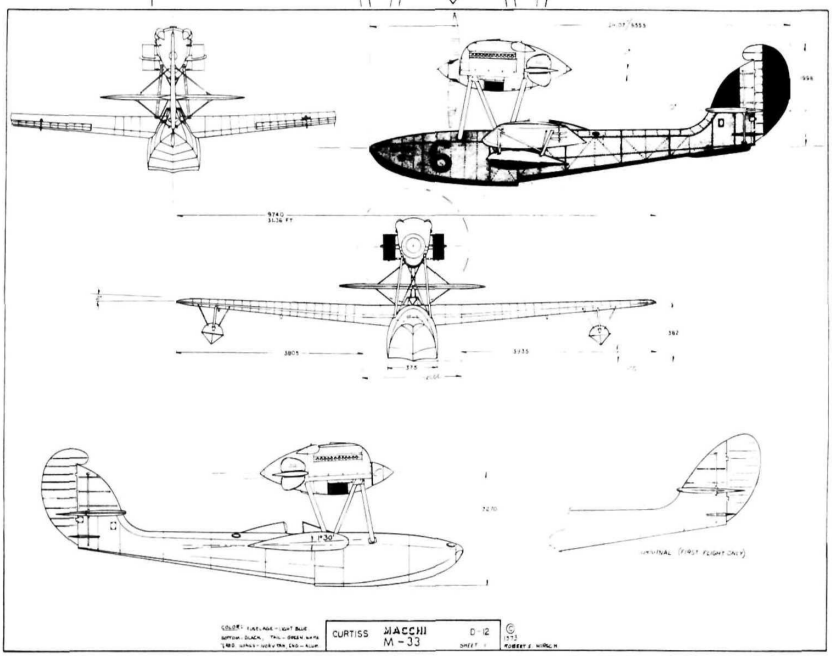






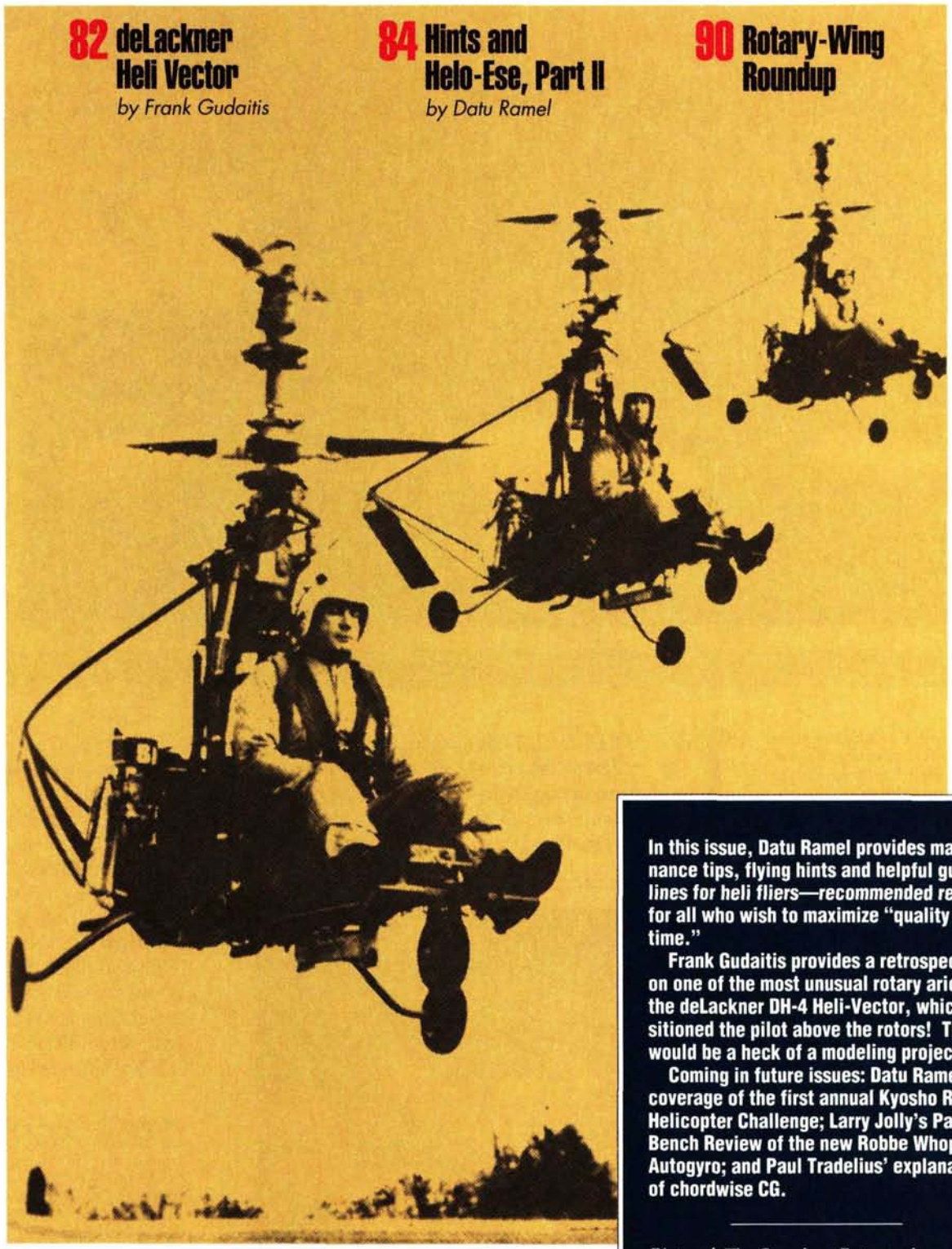


ORIGIONAL SPAN & CONFIGURATION



Feast your eyes, pick a favorite, and maybe we'll see you in Havasu in 1991!

HELICOPTER SECTION



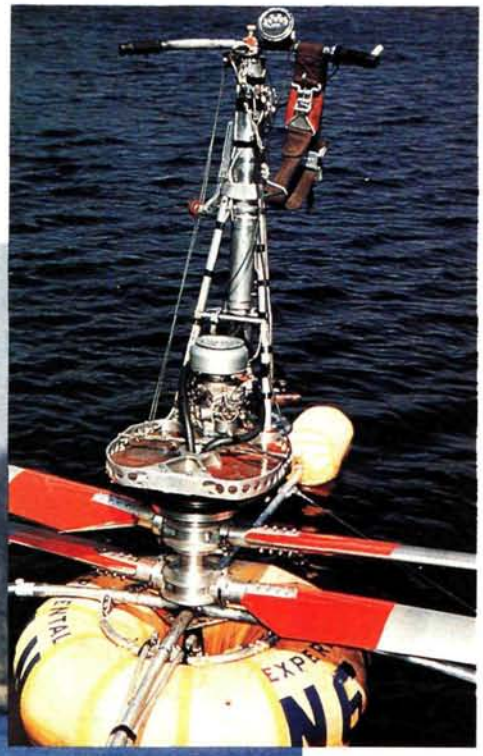
In this issue, Datu Ramel provides maintenance tips, flying hints and helpful guidelines for heli fliers—recommended reading for all who wish to maximize "quality air time."

Frank Gudaitis provides a retrospective on one of the most unusual rotary aricraft, the deLackner DH-4 Heli-Vector, which positioned the pilot above the rotors! This would be a heck of a modeling project!

Coming in future issues: Datu Ramel's coverage of the first annual Kyosho R/C Helicopter Challenge; Larry Jolly's Pad & Bench Review of the new Robbe Whopper Autogyro; and Paul Tradelius' explanation of chordwise CG.

Pictured: The Gyrodyne Rotorcycle was a one-man, coaxial, portable helicopter produced for the USMC.

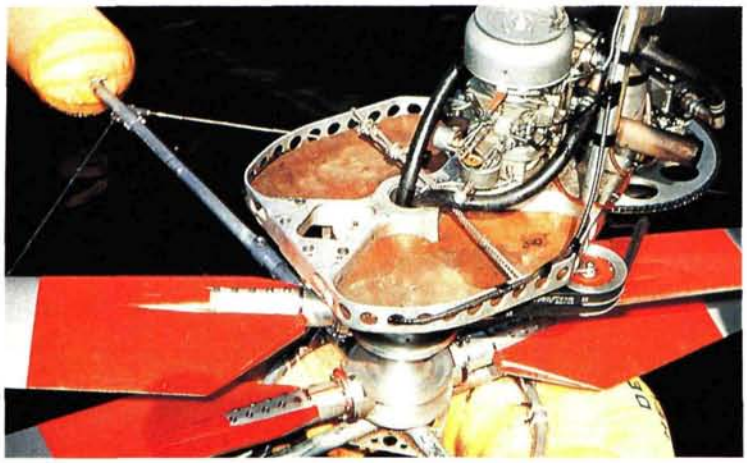
Right: A twist-grip on the handlebars controlled the throttle, and a clutch lever operated pulleys to engage the drive system. A cargo lift line could be attached through the hollow rotor shaft.



Above: Canadian engineer Lewis McCarty flies the early '50s Heli-Vector prototype. The amphibious craft was exceptionally stable—directional control was achieved by the pilot leaning!

THE HELI-VECTOR was radically different from conventional helicopters in more ways than just its "inverted" appearance. It was inherently stable and relatively simple in its mechanical design, and it was one of the least costly to manufacture.

Although the prototype shown on these pages was constructed in 1954, the idea of positioning the pilot *above* the rotors wasn't new: it originated 40 years earlier as a very ingenious idea of aeronautical scientist Dr. Theodore von Karman. With two other Hungarians (Petroczy and Asboth), he designed and built a coaxial, twin-rotor lifting machine that was intended to replace



The prototype was powered by the Mk 20—a 20hp, 2-cylinder, two-stroke, liquid-cooled outboard made by the Kiekhaefer-Mercury Co. Later versions carried a 4-cylinder Mk 55 with more than twice the power.

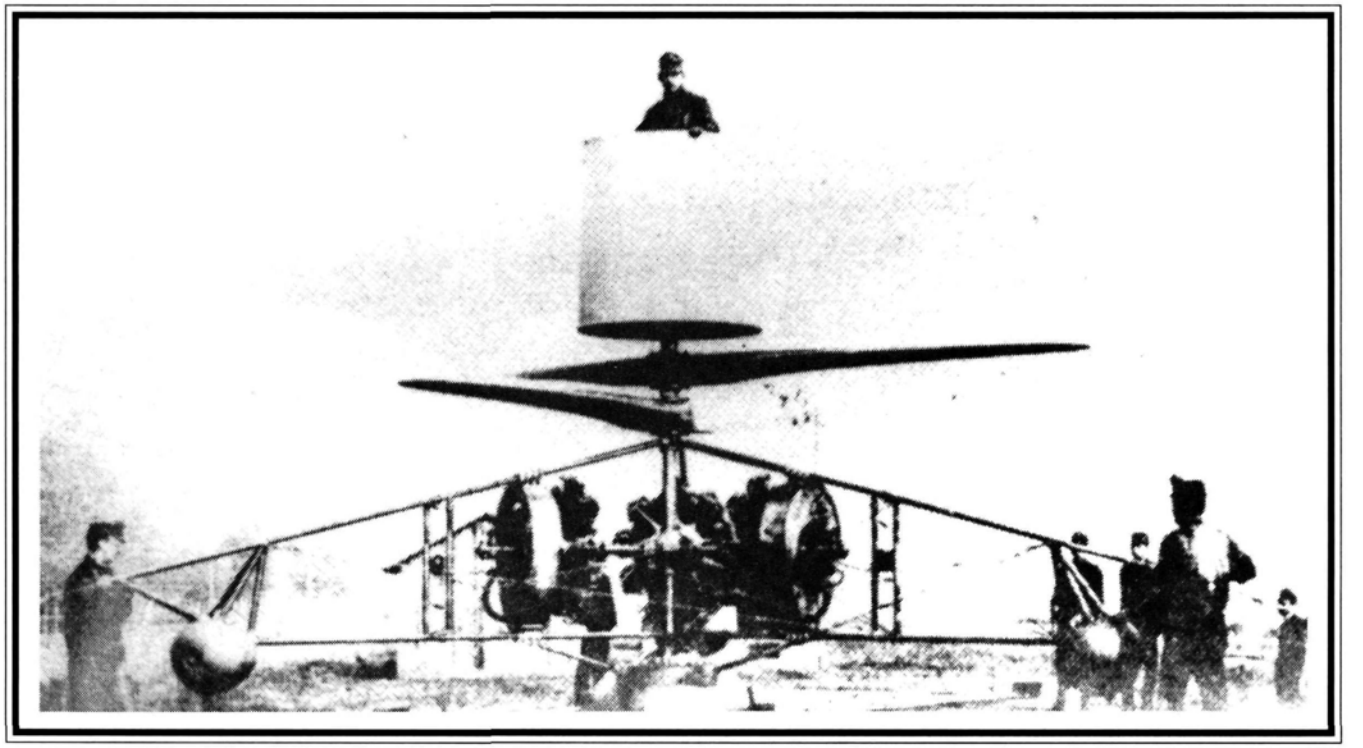
The deLackner DH-4 Heli-Vector —one of the world's most unusual helicopters

deLackner HELI-VECTOR

by FRANK GUDAITIS

kite balloons for military observation.

The trio's machine was much larger than the Heli-Vector and was powered by three, 120hp, LeRhone, rotary, air-cooled engines. The only control used by the von Karman machine was a throttle to control engine speed. It was capable only of vertical flight and was tethered to the ground by a steel cable. Its operational height was approximately 50 meters, and it could stay aloft for approximately 1 hour. Its operator/observer stood inside a barrel-like shield—undoubtedly to protect him from sniper fire.



Powered by three 120hp LeRhone air-cooled engines, the Petroczy/von Karman 1916 coaxial twin-rotor lifting machine was the first rotary aircraft to place the pilot above the rotors. It had an operational height of about 50 meters.

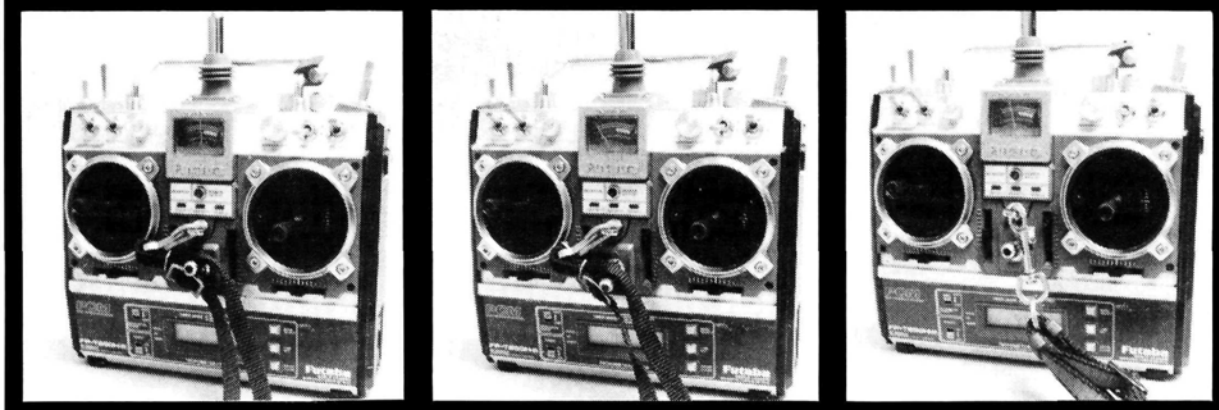
CANADIAN RESURRECTION

Four decades later, this rotary-wing configuration was resurrected by Canadian engineer Lewis McCarty. To achieve directional flight control, McCarty utilized certain basic research that was the work of another brilliant aeronautical engineer: Charles Zimmerman of the National Advisory Committee on Aeronautics. Zimmerman will also be remembered for his original designs of the "Flying Flapjack," the Chance Vought V-173 prototype and the XF5U (a Navy fighter that was capable of controlled flight in an incredible speed range of 25 to over 400mph).

Charles Zimmerman discovered that directional flight control in this type of rotary-wing aircraft could be achieved by having the pilot slightly shift his weight and lean in the direction he wished to go. This simple expedient eliminated the need for the very compli-

(Continued on page 120)

PART II



Despite the "detent," which is designed to keep the toggle in the "up" position, a stock transmitter strap can catch on on/off switches and pull them off. A swivel link on the strap can help you avoid this type of problem.

HINTS & HELO-ESE

by DATU RAMEL

More everyday, practical and helpful advice

"Electric" accessories: crimping tool and connectors; twist connectors, 3-amp fuses for transmitters; and alligator clips.

MICROMETEOROLOGY

EVERYONE EXAGGERATES how steep (skiing), how long (fishing), how fast (driving) and how much (envy), and helicopter pilots tell *wind* stories!

We hover in *gale force* winds (and Paul Bunyan uses redwoods for toothpicks!). "Micrometeorology" refers to weather in a very small area, e.g., the movement of air below 200 feet at your flying field. The wind rushing through the gap in those trees looks like a storm front to your Shuttle.

1 Actual wind speed doesn't matter as much as variations in wind speed. A steady 30-knot headwind wouldn't pose much of a problem for a model helicopter because it sees air speeds of 30 knots or more in fast forward flight. Problems with wind arise when we change direction in it (such as turning from upwind to downwind), or when gusts and rotors (more sustained, rotating gusts) come our way.

2 When turning from downwind to upwind, you gain altitude and lose ground speed; when turning from upwind to downwind, you lose altitude and gain speed. It sounds simple, but many pilots avoid windy days so that they never gain first-hand experience. Before you initiate a turn, think about what kind of tailwind or headwind you'll have coming out of it.

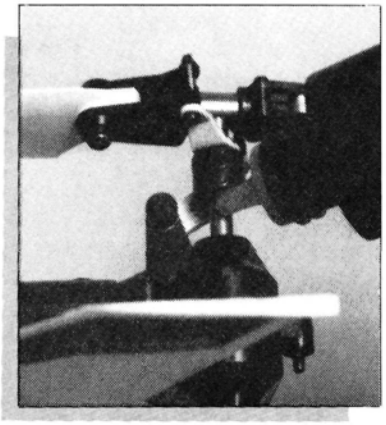
3 We define a "gust" as a sudden increase in wind speed, but what really matters to us is the

sudden *decrease* in wind speed when the gust has passed. When a gust comes along, your hovering helicopter balloons or gains altitude because of the abrupt increase in translational lift.

You reduce throttle-collective to correct to a lower altitude, but then the air is calm for an instant as the gust/rotor goes by, and now you're at a fast-descent-pitch setting only a few feet off the ground. An urgent jab at the TC stick keeps you in the air, but the wind speed increasing and then decreasing all the time—and forcing your machine to do the same—is what makes hovering in wind unnerving.

4 Wind rotors and gusts are caused by obstructions diverting and stirring up wind near the grounds. If the wind had a choice, it would try to blow smoothly (laminar flow) all the time, but hills, trees and buildings, etc., get in the way. Anything above the ground can alter the local distribution of wind velocities; perhaps not enough to affect a full-size JetRanger, but certainly enough to affect a 10-pound helicopter.

There's good news and bad news about micrometeorology. The good news is that the air is less turbulent away from the ground and its obstructions—say, at an altitude that's 1½ times the height of nearby trees (approximately 50 feet).



For helicopters with a sliding T-R pitch collar, oil the T-R shaft every flying day.

5 The bad news is that the higher air (at 100 feet), with less severe gusts and rotors, moves much faster (say 50 percent faster) than air on the surface. If the weather forecaster says, "Wind today, 16 miles per hour," then your helicopter at aerobatic altitudes will see 24mph.

SETUP

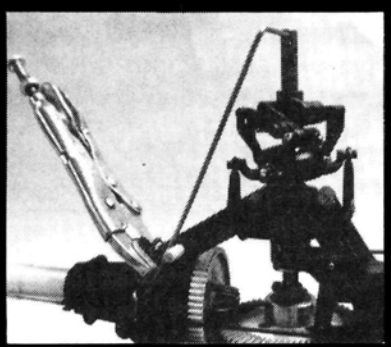
6 If you have a machine whose tail rotor uses an external pitch slider, oil the shaft every day you fly.

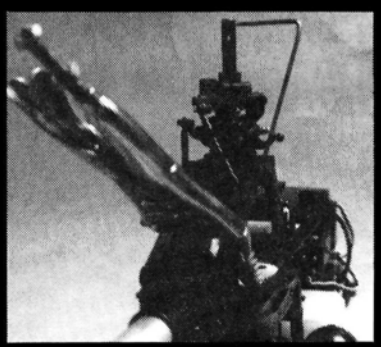
7 The black (negative) wire of the receiver battery leads can corrode after repeated charging during a full flying season. Inspect and replace it as necessary.

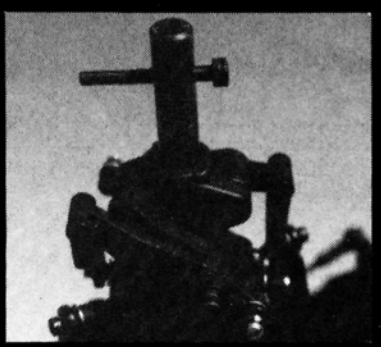
8 The battery pack is the heaviest component in your receiver system, so it's likely to damage other components during a crash (secondary damage). For this reason, mount it last. First, visualize how it will fly out of its foam and rubber bands, and try to minimize the likelihood that servo leads will be jerked and the receiver case squashed if your machine crashes.

9 The adhesive tabs that come with radio sets are fine until fuel gets on them; then they slide all over the place. Mark the servo leads at the receiver end with stripes that match the channel number. (It helps to memorize the functions of the respective numbers.)

10 Before mounting your servo wheels, put the transmitter sticks and trims at a base position such as low TC and neutral cyclic. Mark the end of the servo shaft at a convenient reference point such as horizontal, vertical, or 90 degrees







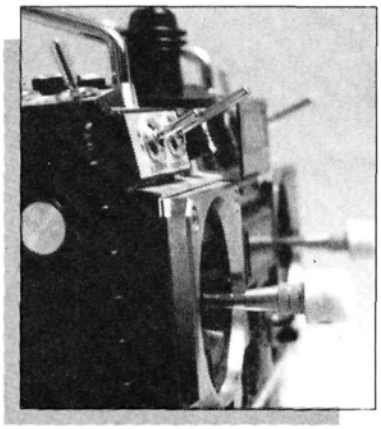
■ *Left and Center: Field solution to the problem of determining whether your main shaft has been bent in a crash. Vise grips hold a piece of hanger wire in position to serve as an indicator.* ■ *Right: The safety bolt must have an un-threaded shank.*

to the pushrod. The aileron, elevator, and tail-rotor servo wheels are now easy to align if you have to rebuild.

If you use this method with the collective and throttle wheels, you must write down how far, in estimated degrees of angle or clock-face terminology, the servo ball is away from your reference mark: "Collective servo shaft at 12 o'clock vertical at low stick; servo ball at 1 o'clock/30-degrees clockwise. Wheel rotates counterclockwise to raise pitch."

11 Measure and write down the lengths of all your pushrods before you fly a new helicopter and every time you find a new working setup by experimentation. Use a metric ruler (preferably a flexible one), and measure from ball center to ball center.

12 The "jesus bolt" is the bolt that secures the rotor head to the top of the main shaft. *Use only shanked bolts for this.* This bolt is subject to high shearing forces, and a fully threaded bolt isn't quite as strong as a shanked bolt.



Rubber door-stop-bumper tips from the hardware store make good finger-and-thumb grips for transmitter sticks.

13 The M2 rods used in our helicopters have a thread pitch of 2.5 turn per millimeter. The natural motion of your hand is a half-turn, or one twist, so there are five twists per mm of pushrod length.

14 There are only two possibilities for tail-rotor control-wire movement with respect to gyro sensing. When you hold the machine by the rotor head and rotate it clockwise, the tail-rotor servo will either push, then pull, or pull, then push. When your helicopter hovers well, memorize what the rudder servo wheel does when you rotate the heli clockwise.

15 After a blade strike or boom strike, there's a better way to check the straightness of the mainshaft than by straddling your helicopter and staring at the rotor head while spinning it. Use a clamp or locking pliers to hold a piece of bent hanger wire against the top of the shaft to serve as a simple indicator. (Beats carrying your Unimat in your field box!)

16 Use colored tape that matches the tracking tape, or mark the blade grips in some other way so that you can always put the main blades back into their proper grips.

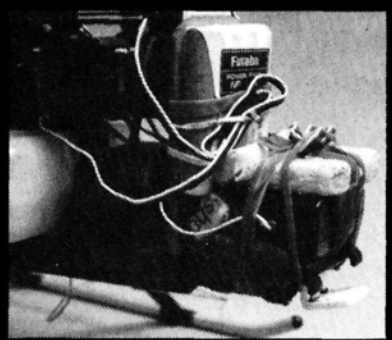
STARTBOX

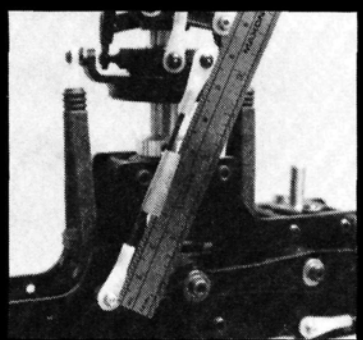
17 Some commercially available power panels have wiring that's too small a gauge to handle high-current starter motors. Replace the wires with automotive (10- to 14-gauge) wire.

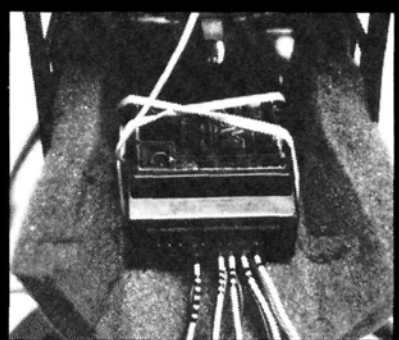
18 Use a crimping tool and connectors to make starter-battery hookups and adapters. Keep a handful of twist-tie connectors and alligator clips in your toolbox in case you need to use someone else's charger with your battery.

19 An R/C car battery charger can drive your glow plug

(Continued on page 89)







■ *Left: This battery positioning assumes the pilot will continue to have nose-down crashes. If the battery breaks free in a crash, it should go over the radio receiver. Stiff form also protects the receiver.* ■ *Center: Measuring the aileron uplink, ball center to ball center, with a metric ruler.* ■ *Right: Servo leads marked with stripes that match the channel numbers: Ail 1; Elev2; Thro 3; Rud 4; Coll-Pitch 6.*

"HELO-ESE"—AN EXPLANATION OF SOME ORIENTATION TERMS

Aspect refers to which view, or face, of the helicopter you see from your controlling position. **Tail-in** is the most common aspect for beginners, who should try the **nose-in** aspect to improve their flying appearance and confidence. There are many aspects besides tail-in, side-on, nose-in and inverted, and these match the many possible viewing angles, but nose-in gets all the attention because it gives us our first experience of reversed and "counter-instinctive" stick movements.

An **outward turn** is a conventional 180-degree reversing turn that has no nose-in component. Consider a heli in forward flight, moving from right to left in front of you. Soon, it's on your left going away from you. To bring it back, you turn right (bank aileron right and yaw clockwise) through 180 degrees so that it's now coming closer from left to right. When the helicopter was turning, you never faced it fully, your nose to its nose.

An **inward turn** is the more difficult 180-degree reversing turn that has a nose-in component. As before, consider a heli in forward flight, moving from right to left in front of you; but this time, when you want to bring it back from the left, you turn left (bank aileron left and yaw counterclockwise). The first few times you try this, your brain will turn to oatmeal somewhere between the 45-degree (1/4 of the reversing turn) and the 135-degree (3/4 of the reversing turn) changes of heading, because you'll have to face the machine's nose. Even pilots who have learned nose-in hovering from the ground up find inward turn very unnerving. Here are some things that can go wrong:

- In the panic of trying an inward turn, you resort to something familiar to bail out. After making scores of outward reversing turns, you know that "When the helicopter is on my left, I start the reversing turn by banking right and giving clockwise tail rotor, and I finish by banking left to level out and releasing the clockwise tail rotor."

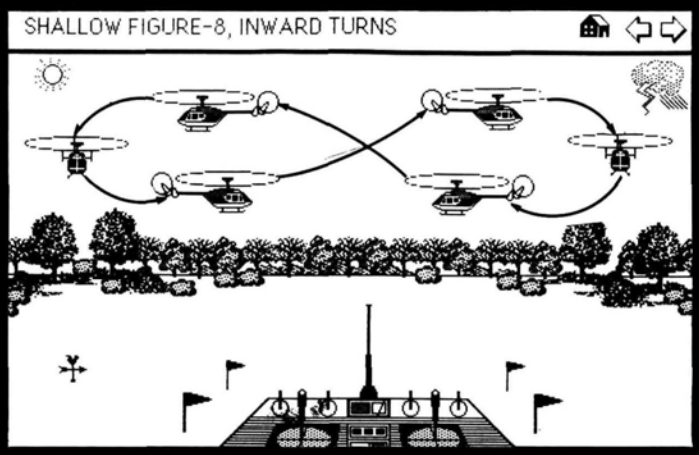
When you see the nose during an inward turn, it suddenly feels weird; now, the most important thing in the world is to *finish the turn*! You think you should *bank left and release clockwise tail rotor* because the machine is on your left. But you're already turning left! What you just did made the bank more severe, and your helicopter does an undignified counterclockwise death spiral into the firma.

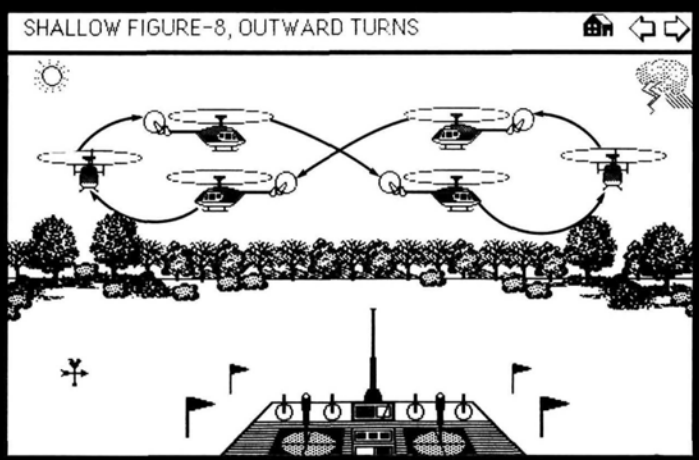
- Let's say you avoid panic enough to arrest the heli's forward flight just as it gets to the nose-in aspect. Even though you may be able to hover nose-in, it may not help you, because now the helicopter is much farther away from you than it was when you practiced, and you can't read its attitude. Get it turned around; get it closer; or get it down!

- There's more bad news! Let's say that you practice that inward reversing turn (a left turn) from the left side, so that you can fly an inward turn on the left to go along with the familiar outward turn—a left turn, done on your right. Both turns are left turns, so you're executing a large counterclockwise oval in front of you. Fine; but when you try the oval pattern in a clockwise direction, with right turns at both ends (an outward right/clockwise turn on your left and an inward right/clockwise turn on your right) you'll be back in Panic City!

Take a minute to review the combinations: on your left, a right turn is outward, and a left turn is inward. On your right, a right turn is inward, and a left turn is outward.

What's all the fuss about inward turns? Well, if you aspire to fly in FAI competition, the horizontal-9 of the hovering maneuvers has a substantial inward component to its circular turns,





and the 180-degree autorotation, depending on which way the wind is blowing, can be one huge, inward, diving turn. It's important for beginners and intermediate pilots to learn inward turns because it increases confidence when the sun and wind are "all wrong."

Let's take another look at that counterclockwise oval flight path. If you shorten the "straightaways" enough, you'll be flying a left-hand circle in front of yourself. This is an *exterior* circling maneuver. The pilot stands outside the figure traced by the helicopter. The familiar tail-in circle (a novice maneuver) and the more difficult nose-in circle (an FAI maneuver) are *interior* maneuvers, because the pilot stands at the center of the circle and the helicopter orbits him.

An exterior nose-in circle is when the helicopter orbits in such a way that the machine's nose always points to the center of the circle and the pilot's not there. In our hobby of confusing controls and frequent disorientation, it may not surprise you that I find an exterior tail-in circle more difficult to fly than an exterior nose-in circle.

In a breeze, all circling maneuvers are troublesome because of the **contrary cyclic** phenonenon. At one point in a circling figure, the helicopter will be going sideways against the wind, and at the opposite side of the circle, the heli will be going sideways with it. For a clockwise tail-in circle (you're standing at the center, so it's the interior version), you'll mostly be giving right-cyclic commands, because the right side of the helicopter is leading the way. There will, however, be a point on the downwind side of the circle, when the wind pushes the machine's left side, where you'll need a "dab" of left cyclic—a command contrary to your instincts—to maintain proper air speed even though the heli is moving to its right!

Did I ever say it would be easy?!

HINTS & HELO-ESE

(Continued from page 87)

when set at 3 1/2 amps of current.

MISCELLANEOUS HELI HINTS

20 When you take photographs of R/C helis, if you want some blade rotation to show, use shutter speeds of 1/125 second or less.

21 For training gear, use two nylon ties on each stick—one to attach the stick to the skid, and another to attach the stick to the landing strut. When secured this way, the sticks and balls are less likely to vibrate loose or shift. You can bulk-order nylon ties from Transmotions, Inc.*

22 Hardware-store rubber doorstop bumpers make good grips for your transmitter sticks. Just glue them to the stock metal tips.

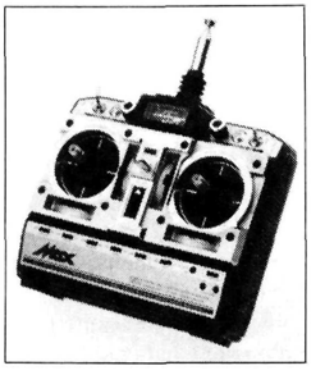
23 At last summer's World Championships in Virginia, one of the European pilots earned a zero for one round because his transmitter strap snagged his radio tray and his machine, shall we say, "offended" the judges during the taxi-out. I almost had a flyaway once because, when I turned my radio over to get to an adjustment pot, my strap caught on the power switch and turned off the radio. Look carefully at your transmitter strap and anticipate what could go wrong. I remedied my situation by putting a swivel snap on the end of my strap.

Happy hovering!

**Here's the address that's pertinent to this article:*
***Transmotions, Inc.**, P.O. Box 160, North Hollywood, CA 91603.*

■

ROTARY-WING ROUNDUP



HOBBY DYNAMICS DISTRIBUTORS
MAX 5 FM/5-Channel FM Helicopter

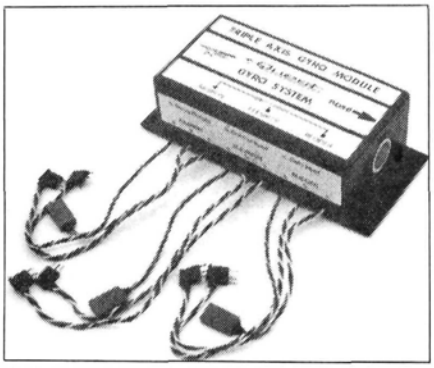
The JR MAX radio systems are of high quality. This package contains an ABC&W 7-channel receiver, five JR 507 servos, a plug-in transmitter battery pack, rechargeable transmitter and airborne Ni-Cds, a 1000mAh airborne Ni-Cd, a high-output Ni-Cd charger, complete servo accessories and hardware. Features include servo-reversing, dual rates, double-ratcheted trims for primary controls, ATS, throttle hold, pitch trim and adjustable pitch curve.

Part no. J5FH

Price: $399.99

For more information, contact Hobby Dynamics Distributors, 4105 Fieldstone, Champaign, IL 61821.

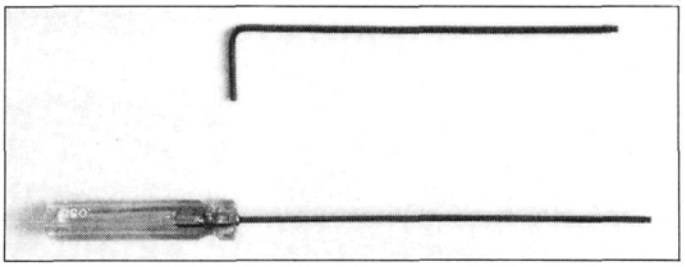
CENTURY SYSTEMS
Quest Triple Axis Gyro Module



This device can sense rapid changes in an aircraft on all three axes, i.e., roll, pitch and yaw. Let's say a gust of wind lifts one wing of your plane. The Triple Axis Gyro Module will sense the movement and modify the command to the aileron servo to correct the wing's change in attitude and return the plane to normal flight. The other two axes are controlled in the same way. Send $1 for a catalogue.

For more information, contact Century Systems, P.O. Box 868, El Toro, CA 92630.

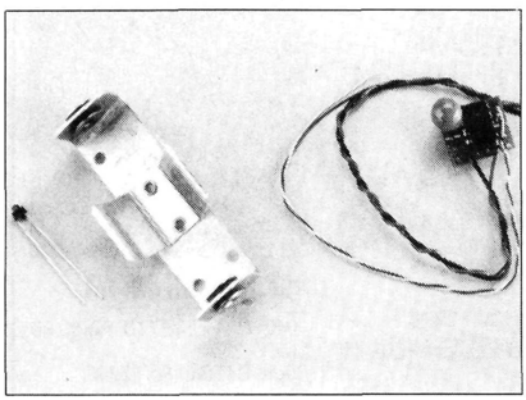
DU-BRO PRODUCTS
Ball Wrenches



Du-Bro offers two new ball wrenches that work well on the 4-40 socket setscrews that are included with some of its collars and other hardware.

Part nos. 507, 508.

For more information, contact Du-Bro Products, 480 Bonner, P.O. Box 815, Wauconda, IL 60084.



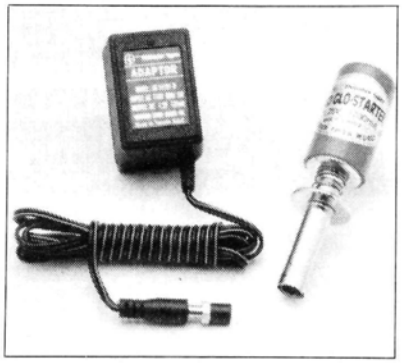
SCALE MODELING SUPPLIES
Flasher LED Unit for Heli Models

Scale Modeling Supplies has added a new product to its line of modeling electronics and accessories. The 1.5V electronic flasher unit is 1 inch square and comes fully assembled. The LED is available in red, yellow, or green, and it's perfect for use in model aircraft, cars and boats. The unit has minimal wiring, and it can be rigged for use with a switch. It operates on a single AA, C, or D battery, and it produces no heat. The unit is set to flash once per second, but other rates can be custom-ordered. It will provide continuous flashing for 3 months with a standard AA battery, 7 months with a C battery and 1.3 years with a D battery.

Price: $11.95 (one 1.5V flasher with LED and battery holder), plus $1.50 for postage and handling.

For more information, contact Scale Model Supplies, P.O. Box 158, Cheektowaga, NY 14225.

GLOBAL HOBBY DISTRIBUTORS
Glo-Starters

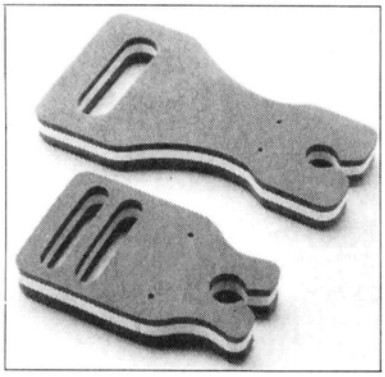


The Thunder Tiger Glo-Starter (pictured) and the Long Reach Glo-Starter are the most reliable, handy and economical ways to light glow plugs. They're pocket-size for easy storage, fully portable and give years of service. Up to 50 starts (of 15 to 20 seconds each) are possible from the fully charged, single Ni-Cd power cell inside each one. A locking glow-head tube securely fastens either Glo-Starter to a glow plug, and thumb pressure quickly releases it. The separate wall charger (with extension cable) has an indicator light to let you know when recharging is under way. Full recharges from any 110V AC outlet are possible overnight.

Part nos. 110480 (Glo-Starter), 110482 (Long Reach Glo-Starter).

Price: $24.95, $25.95.

For more information, contact Global Hobby Distributors, 18480 Bandilier Circle, Fountain Valley, CA 92728.



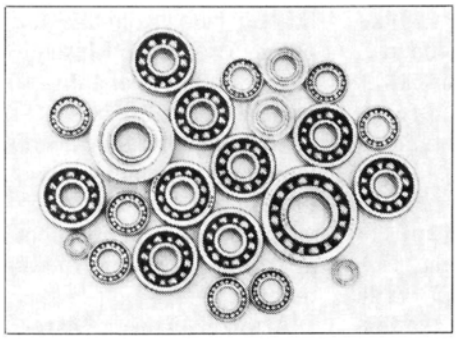
GREAT PLANES MODEL DISTRIBUTORS
Heli-Max Blade Holders

Hobbico announces Heli-Max—a new line of helicopter accessories that now includes a blade holder for 30- and 60-size blades. The Heli-Max blade holder is the perfect way to keep blades stationary during transportation or storage.

Part nos. HMXE1000, HMXE1005.

Price: $3.95, $4.95.

For more information, contact Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.



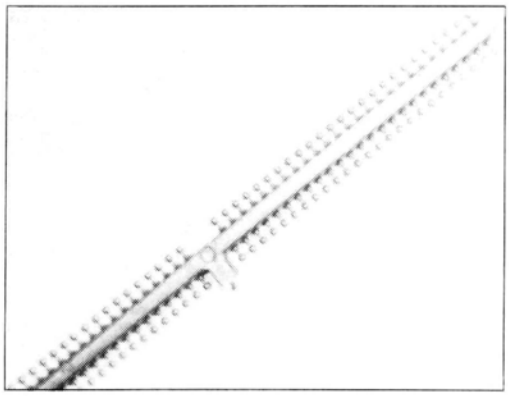
BOCA BEARING CO.
Helicopter Bearing Guide

Now available from Boca Bearing Co. is an updated version of its helicopter bearing guide. New heli models include the GMP Rebel, the Kalt Cyclone II, the Kyosho Concept 30 and the Miniature Aircraft 30 and 40.

Price: $3

For more information, contact Boca Bearing Co., 7040 W. Palmetto Park Rd., Suite 2304A, Boca Raton, FL 33433.

SCALE HOUSE HELICOPTERS
Rivets



Now available for modeling purists—scale rivets to make your plane, heli, boat, or rolling-stock model look like the "real thing." These rivets include the head only, so no drilling is required; just glue them on. They're compatible with CA and paint, and they're easy to remove, if necessary. Each bag includes 400 of one size.

Part nos. 101 small (.030-inch diameter); 102 medium (.050 inch); and no. 103 large (.070 inch) for 1/8, 1/5 and 1/4 scale, respectively.

For more information, contact Scale House Helicopters, 1152 N. 150 E., Chesterton, IN 46304.

GOLDEN AGE
OF RADIO CONTROL

by HAL deBOLT

Up in Them Thar Hills with the Aeroguidance Society

A WHILE AGO, I mentioned that our older clubs could be great sources of OT R/C information. Many old-timer members keep good records of organizations that had a great influence on the early progress of R/C, and valuable input from Myron Cary and Bob Noll has come my way.

To paint the picture: nestled in the Susquehanna River valley in the hilly part of New York State are the cities of Endicott and Vestal. IBM is the major industry, so the population includes many people who are interested in electronics—and they're also interested in R/C! Free flight was established in the area before IBM arrived, and R/C has boomed—and with good reason, as my prewar free-flight experience there demonstrates. I can still picture one of my Blitzkriegs disappearing over the surrounding hills!

Cary's 1967 silk-and-dope-covered LW Champ is still going strong today, powered by a modern Enya .40. Note modified rudder and neat paint scheme. More than 800 flights logged!

PHOTOS BY HAL deBOLT

Aeroguidance Society member Myron Cary with his current, vintage-era LW P-Shooter. It performs well with just a .30 Wankel and modern propo radio.

AVID AEROGUIDERS

Bob Noll says that the Aeroguidance Society was formed in 1954 when the number of area R/Cers had grown. Of the charter members, only three are still active: Ralph Jackson, Dick Allen and George Brooks. (These names should spark memories of the early Nats.)

The Society's meets have been a mainstay of Northeast pattern competition from the first rudder-only event in 1954, and they've attracted many "big names." Bob says that the major feature of that first meet were the many flyaways—again, over those darn hills!

This progressive club always supported pylon racing—from the original AMA solo racing right through Formula I and Formula II. Formula II? These larger planes met the original FAI requirements, and many enjoyed their tamer flights. Bob Noll still has the plane with which he became the '68 NMPRA National Formula II Champion.

RUNAWAY MUSTANG

One Aeroguidance race led to an experience that I doubt could ever be duplicated. The Endicott contest site was the Tri-County airport runway, which was on an island in the river. The river stretched for miles off the end of the runway, and a row of trees blocked the view up river. I took off, and everything went well until my radio quit halfway as I headed back from the far pylon. My Midget Mustang cleared the trees and disappeared!

Some thought they heard the engine fade, and we thought it had crashed somewhere beyond the trees, but a thorough search found nothing.

A few days later, Myron Cary had a call from a man who told a story that was very difficult to believe. He and his son were fishing from a boat in the middle of the river when their attention was drawn by the sound of an engine coming up river. As what they *thought* was a full-scale plane approached them, they heard the engine die and saw the plane drop into the river. Alarmed, they rushed to rescue the pilot,

(Continued on page 94)

FALCON 880

(Continued from page 68)

a couple of hand-launches to get the proper centering on my elevator, our hand-launching record holder Rob Tessio volunteered to give the Falcon its final launch before we used the winch. I made a beautiful 360-degree turn around the field and landed within a few feet of the initial hand-launching—very impressive for a plane that weighs 4 1/4 pounds.

We were now ready for a winch launch. From the moment I released the Falcon, its climb-out was spectacular. When the Falcon was released at the top of the launch, it immediately struck a thermal and was in its element. In an 18-knot wind, it thermalled so smoothly that it was difficult to believe there was any wind. After a few minutes, the Falcon was thermalling out of sight and downwind. I then headed it back upwind, because it was beginning to look like a mere speck.

I fed in some down-elevator to pick up speed, and the Falcon headed toward us at an incredible speed. I executed a graceful loop and then a crisp aileron roll—to the right and then to the left—without losing my heading. Awesome! I put the Falcon in the "crow" mode, and, in what seemed like 30 seconds, it made a perfect landing at my feet.

CONCLUSION

The claims I had read about the Falcon before building it all seemed a little exaggerated, but they weren't. The two-and-a-half-month order backlog is understandable. This is one of the nicest, most forgiving sailplanes I've flown.

I exhibited my Falcon at the 1990 WRAMS Show, and when the static judging of sailplanes was completed, I found we had won a 3rd-place trophy.

I'll definitely order a second one for the next contest season, because I think it's the "ultimate" sailplane.

**Here are the addresses of the companies mentioned in this article:*

Flight Lite Composites, *P.O. Box 1493, Windsor, CA 95492. Tel. (707) 838-3390.*

Airtronics Inc., *11 Autry, Irvine, CA 92718.*

Sullivan Products, *1 North Haven St., Baltimore, MD 21224.*

Formula-U; *distributed by Pactra PlastiKote Co., 1000 Lake Rd., Medina, OH 44256.*

Chevron Hobby Products, *P.O. Box 2840, Sandusky, OH 44870.*

MonoKote; *distributed by Top Flite, 2635 S. Wabash Ave., Chicago, IL 60616.*

Carl Goldberg Models Inc., *4734 West Chicago Ave., Chicago, IL 60651.*

Vinylwrite Custom Models, *16043 Tulsa St., Granada Hills, CA 91344.* ■

but all they found was—you guessed it!—the wreckage of my Midget Mustang. Here's the zinger: their fishing spot was *5 miles from the airport!*

HIGH FLIERS?!

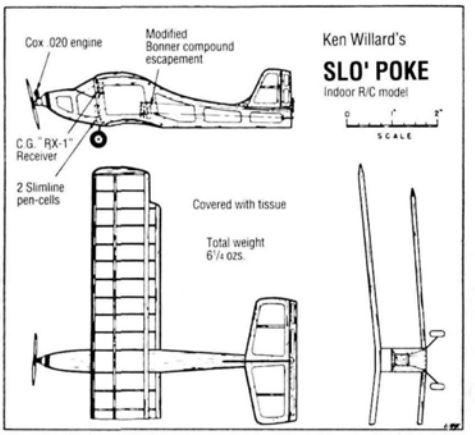
All clubs seem to have flying-field problems, and in the Endicott area, fliers had to cope with a scarcity of flat land. In 1960, the club found it could afford to buy 16, "undesirable" hilltop acres. I remember appreciating the fact that, on reaching the end of the runway, your plane already had hundreds of feet of altitude! What's more, in 1975, profits earned from the sale of this site enabled them to buy a 75-acre field, and they expanded to 97 acres in 1987!

INDOOR R/C—in the '50s?!

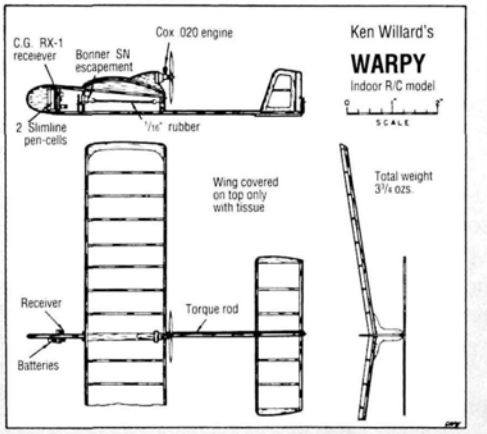
Do you remember Ken Willard's flight over the Pacific to Catalina Island and his early endurance record? Here's another of his early exploits. If you attend R/C trade shows in California, you'll know that indoor R/C is practical because you've seen the Nacarato family doing it so well; but indoor R/C flying in the early '50s—no way, you say? Believe it!

As Willard's endurance flights show, he was always looking for R/C challenges, and when someone said it was impossible to fly R/C indoors, he quickly picked up the gauntlet!

To tackle the problem, he used basic modeling techniques and a judicious application of his knowledge of aerodynamics. Contrary to what's usual, for indoor flying, he designed specifically for *slow* flight and maximum directional control with rudder only. The three-views show how he did it, and his comments about the models are interesting.



Ken Willard's first successful attempt at indoor R/C flying. His Slo Poke had just the right features to obtain slow flight.



The Warpy was Willard's most successful indoor plane. Weighing only 3¾ ounces, its flight speed was walking speed! All this in the early '50s!

First, of course, he needed the lightest possible radio system: the minute C.G. RX-1 receiver, a Bonner SN escapement and a couple of AAA pen-cells for power. The lightest available engine was the Cox .02, which would have been too powerful, so he obtained just the right amount of thrust by installing a second, *metal* prop *behind* the usual one. He carefully adjusted the metal prop's pitch to reduce thrust to a useable amount.

Aerodynamics? To ensure slow flight, he designed for flight at a high angle of attack, close to the stall angle. He did this by using high-lift (cambered) airfoils and a large angular difference between the wing and tail—a "single-speed" arrangement that was as close as possible to the stall speed. His plane required a great deal of downthrust to ensure that its angle of attack wouldn't reach the stall angle under power. Flight reports tell us this worked very well and required a flying area of 100x125 feet.

Three models were used:

- The first was based on the successful "Breezy" bipe design, and it proved to be too fast.
- In the second—a Slo Poke bipe—the Breezy's cabane struts were replaced by a cabin that increased drag and produced the slow-speed flight Willard wanted. It's amazing that this 33-inch-span model weighed only 6½ ounces, ready to fly!
- Willard's most successful indoor model was the monoplane, Warpy, which weighed only 3¾ ounces! He based it on his experience with the Slo Poke. Note its stick-type fuselage, structure and absence of landing gear. The pusher prop was good for those inevitable collisions and "hand-catches." Yes, it really flew at a walking speed!

Is there really nothing new in R/C?

ALWAYS FRONT-RUNNERS

Ralph Jackson should be familiar to OTers because (among many other attributes) he flew the first four-engine R/C plane (a B-24) at the 1963 California Nats. He was always a first-class scale competitor, but you might not know that Ralph and George Brooks joined forces in the early propo days to form "Advanced Computer Labs." They developed and marketed the ACL propo system, and this was widely used in the area. The ACL was later marketed as the "Valley Electronics" system.

To show that Aeroguidance Society members move with the times, Bob notes that many are now trying electric power, which might just be the wave of the future.

I'd love to hear from the other "Bob Nolls" who can provide us with needed information on clubs that have stood the test of time and continue to flourish.

Finally, for more OT information, you should check out the AMA newsletter, "Cloud 9." OTers check in with their early and current experiences—interesting! Make a small contribution to the AMA Museum Fund, and your name will be added to the mailing list. Contact John Worth* at AMA headquarters.

***John Worth,** *c/o AMA, 1810 Samuel Morse Dr., Reston, VA 22090.* ■

CLASSIFIED

Send ad and payment to *Model Airplane News*, 251 Danbury Rd., Wilton, CT 06897. **Non-Commercial classified ads** (commercial ads of any kind not accepted at this special rate). Rate: 15 words or less, $4.50 payable in advance. No charge for name and address. Additional words, 25¢ each. **Commercial classified ads** (rate applies to anyone selling on a commercial basis–retailers, manufacturers, etc.) Rate: 50¢ per word, payable in advance. Count all initials, numbers, name, address, city and state, zip and phone number. **Closing Date** for either type of ad is the 20th of the third preceding month (for example, January 20th for the April issue.) We do not furnish box numbers. If you would like your ad run in more than one issue, multiply amount of payment by number of months that ad is to run. It is not our policy to send sample copies of tear sheets.

WANTED: Model airplane engines and model race cars made before 1950. Jim Clem, 1201 E. 10, P.O. Box 524, Sand Springs, OK 74063; (918) 245-3649.

PLANS ENLARGED, Large Scale Specialists. PC Model Software. Free information. Concept, P.O. Box 669E, Poway, CA 92064-0669; (619) 486-2464.

WANTED: Berkeley and Cleveland kits or related items: parts, plans, boxes, brochures, books, ads, radio equipment, accessories, etc. Gordon Blume, 4649-191st Ave. S.E., Issaquah, WA 98027.

GIANT SCALE PLANS by Hostetler. We fly what we draw. Send SASE to Wendell Hostetler's Plans, 1041 B Heatherwood, Orrville, OH 44667.

OLD TIMERS, take a ride back in time to airplane modeling roots with this vintage book—*Gas Models*. A true collector's book from the early editors of *Model Airplane News*. It contains the best of modeling from the '30s and '40s, including great technical information and classic construction articles from the Golden Age period. $7.95, add $1.75 S&H; Foreign Surface Mail, add $2.75; Foreign Airmail, $5.50; Payment must be made in U.S. funds drawn on a U.S. bank or by an International Money Order. Air Age Mail-Order Service, 251 Danbury Rd., Wilton, CT 06897.

ANTIQUE IGNITION AND GLOW PARTS CATALOG: 100 pgs., timers, needle valves, original cylinder heads, point sets, drive washers, stacks, spark plugs, plans. Engines: Atwoods, Baby Cyclones, McCoys, Hornets, others. $8 postpaid U.S., Foreign $20. Chris Rossbach, R.D. 1 Queensboro Manor, Box 390, Gloversville, NY 12078.

WANTED: Model engines and race cars before 1950. Don Blackburn, P.O. Box 15143, Amarillo, TX 79105, (806) 622-1657.

R/C WORLD—ORLANDO, FL, CONDO RENTALS—2-3 bedroom-furnished. Available weekly or monthly. Low rates. 100 acre flying field with enclosed hangar. Swimming pool, tennis courts on site. Minutes from Disney World and Epcot Center. For information, call (800) 243-6685 or write Air Age Inc., Condo Dept. 251 Danbury Rd., Wilton, CT 06897.

SCALE MODEL RESEARCH Aircraft Documentation. World's largest. Over 2,700 different Foto-Paaks and 5,000+ drawings. Catalog $3. 2334 Ticonderoga, Costa Mesa, CA 92626 (714) 979-8058.

WANTED: Old unbuilt plastic model kits. Planes, military, figures, cars, promos. Aircraft or missile desk models. Send list, price. Models, Box 863, Wyandotte, MI 48192.

SCALE DOCUMENTATION—Drawings, photo packs, monographs, unusual aircraft. Illustrated catalog, $2, pp: Bill Young, 8106 Teesdale, No. Hollywood, CA 91605.

FOR SALE: 40 *Popular Aviation* 1929-1941. *MAN, FA, AT*, Cleveland Plans. $1 for list. Bruce Thompson, 328 St. Germain Ave., Toronto, Ontario, Canada M5M 1W3.

INTERNATIONAL AIRCRAFT RESEARCH—NEED DOCUMENTATION? Include name of aircraft for availability of documentation with $3 for 3-view and photo catalog. 1447 Helm Crt., Mississauga, Ontario, Canada L5J 3G3.

OLD BUZZARD'S SOARING BOOK: 13 of Dave Thornburg's best essays on R/C glider flying and design. 160 pages, 50 illustrations. $16.45 postpaid. Pony X Press, 5 Monticello Rd., Albuquerque, NM 87123.

SCALE DOCUMENTATION: Detailed aircraft photos, civil, military, Golden Age, etc. Close-ups, markings, nose art, unit badges. Catalog $1.50. AirPhoto, Dept. MAN, 3 Leelynn Circle, Londonderry, NH 03053.

ZOOM IN ON SAVINGS!! Quick Ni-Cd field charger ($44.95) or expanded scale voltmeter ($34.95). We pay shipping!! Quality design and unbeatable price. Units operate both 500/1000 mAh batteries. Dealer inquiries welcome! FREE information: HappyDouper Electronics, Box 90171, Austin, TX 78709.

HELICOPTER SCHOOL: 5 days of hands-on instructions with XL Helicopters and Futaba computer radios. Small classes, tailored to your individual needs. Beginner to expert. Includes all meals and lodging. Over 50 satisfied students and 1,700 flights logged in our first (5) months of operation. Located on a 67-acre airport used exclusively for R/C training. Owned and operated by Ernie Huber, five-time National Helicopter Champion and helicopter designer. Send for FREE information and Class schedule *now* to R/C Flight Training Center, P.O. Box 727, Crescent City, FL 32112-0727 or call (904) 698-4275.

BASEBALL CARDS OF AVIATION HISTORY: 48-card set represents full color reproduction of aviation artist Bob Hill's paintings in a baseball-card size and format. Aviation enthusiasts and card collectors alike enjoy collecting these aircraft from the past and present. Each card contains aircraft's history. Set I: Warbirds, $8 ppd. Set II: Jets, $8 ppd. West Coast Card Connection, 1 West Yakima Ave., #14, Yakima, WA 98902. (509) 453-7272. VISA and MASTERCARD accepted. Send $1 for catalog of other aviation art and games to above address.

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HARDWARE, SOCKET-HEAD CAP SCREWS, @ excellent prices. Example: alloy socket-head cap screws 4-40x1/2, $4.15/100; or stainless, $5.95/100. For free catalogue, write to Micro Fasteners, P.O. Box 42, Netcong, NJ 07857; or telephone (201) 347-2349.

OLD MAGAZINES: *Model Airplane News*, Sept. 1939 to May 1946. *Air Trails*, Aug. 1937 to Oct. 1941, April 1942 to May 1943, Oct. 1943 to Aug. 1944, Annuals: 1938, 1940 to 1944. *Flying Aces*, Oct. 1935 to Mar. 1938 and many more through 1943. Best offer takes all. William Myregaard, 568 Deer Run North, Palm Harbor, FL 34684.

DYNA-JET, never run, factory parts and literature, Ford starting coil. $125. C. Little, (301) 235-1052.

NEWCOMERS TO HELICOPTERS and discouraged beginners. Personal service to get you flying. Money back guaranteed. Rebel Headquarters, Rebel Helo $187.95. Legend Elite Delux $568.50. All Rebel parts in stock. Fun Center, 2287 C. R. 314, Ignacio, CO 81137. Call Howard (303) 563-4311.

ENGINES, KITS. Buy/sell list $1 and SASE. Send to George Lee, 19821 Scotland Dr., Sarasota, CA 95070.

FOR SALE: New Cobra heli w/Ranger body, O.S. 50 engine, Futaba F.G. 7-channel radio. $1,000 firm. Used Cobra O.S. 50 engine, Futaba F.G. 7-channel. $800 firm. Joe Diamond, 832 Buren #84, Ketchikan, AK 99901 (907) 225-3026.

GIANT STEPS

Giant Aeronca "Grasshoppers" and alternative materials

by DICK PHILLIPS

I'VE RECEIVED another new plan. This one is from Dick Say*, and it details an Aeronca L3-B. Dick is a member of STARS (Southern Tier Aero Radio Society), the well-known group in Olean, NY, that's headed by George Privateer and has for many years promoted large models. They were the first to construct a squadron of Bristol Scouts, which they flew together for some time. Although many of the Scouts have been retired, a few can still fly.

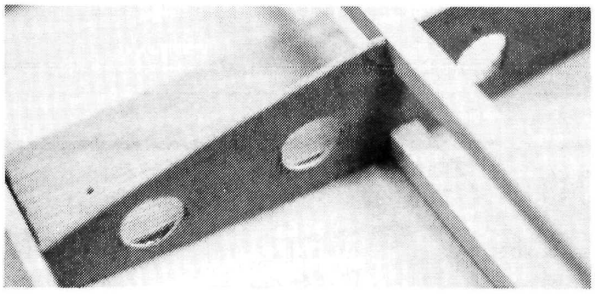
The Aeronca spans 105 inches in 1/4 scale, it weighs 15 pounds, and its area is 1,440 square inches. Its wing loading is light at 24 ounces to the square foot, and the recommended engines are 2-stroke, .90 to 1.3 cubic inches and 4-stroke, 1.2 to 1.8 cubic inches. At the indicated weight, this model should fly well with any of these engines. The Aeronca is an ideal introduction to plans building, and it's also an excellent trainer, because it satisfies all the usual criteria for such a model: it has a high wing, it's easy to build, and it has excellent flying characteristics.

The plan is on two large sheets and one small one, and it contains all the information you'll need.The 12-page manual is well-illustrated with photos of the original airplane, and it contains building details geared to the inexperienced builder. It should fly very well and provide a lot of enjoyment as your first model, or as your first large model.

BUILDING

Last month, I talked about putting your models away for the winter. (I know; those of you who fly in Florida and the Southwest don't have this problem!) Storing models properly doesn't take long, and you'll probably want a building project or two for the months when you can't fly. If you've built only kits, this might be a good time to see which plans are available. I have about 200 plans for 1/5-scale models and larger, and there are literally hundreds for smaller models.

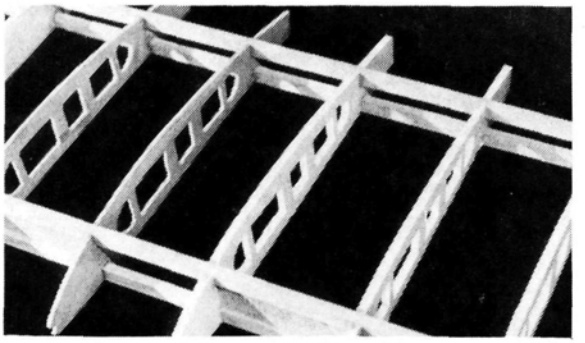
Example of substitute material. The plywood used to make the firewall and former is strong, easy to work with and inexpensive.



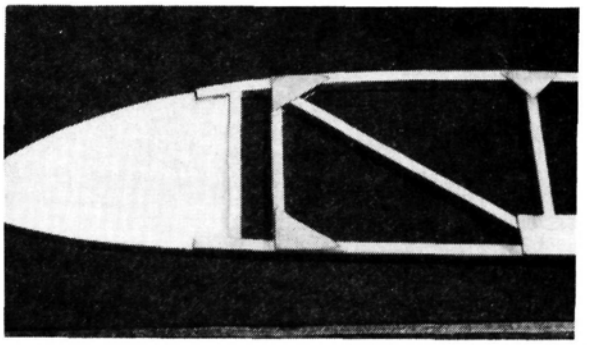
Mahogany-door skin plywood used for wing rib is inexpensive, strong and easy to work with regular modeling tools. Lightening holes reduce weight, but are seldom necessary. Easily cut with a hole saw.

SUBSTITUTE MATERIALS

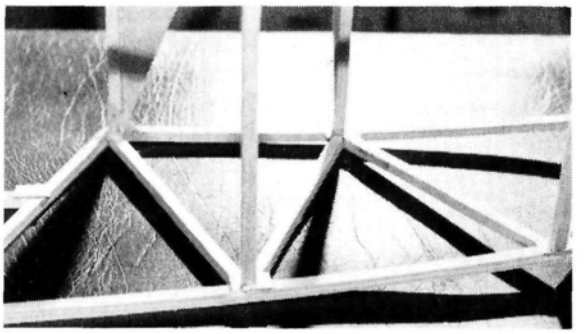
Usually, plans can be altered to suit the documenyou can cut your tation. As long as it maintains the same strength and structural integrity, you can substitute material for that specified on a plan. You can also make substitutions that are less expensive and provide greater strength. For example, I often buy Sitka spruce planks from a supply house and then cut them to size. Wood that isn't certified by the FAA for the construction of home-built full-scale airplanes is often reasonably priced and is fine for our models. If a plan specifies a wood size that isn't readily available,



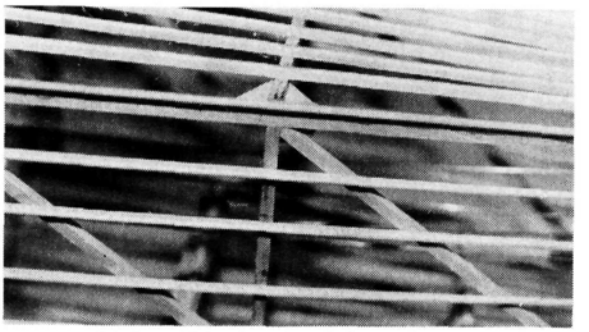
Combination of mahogany-door skin and foam-core used for wing ribs. Use the mahogany where strength is required (i.e., for landing gear or wing-strut mounting areas) and the foam where shaping is required.



Built-up wing rib is gusseted at all joints. Strip material shown is 1/8-inch square. Gussets strengthen the entire structure and add practically no weight.



Gusset at corner of fuselage base. Gusset adds considerable strength but negligible weight. Most of the material shown was a substitution and was cut by the author.



Gussets added to all fuselage butt joints. These strengthen a weak joint and help prevent the fuselage from twisting.

you can cut your own to size with good results.

I cut a lot of my own wood, and I use a hollow-ground planer blade that smooths the edges beautifully. I've used Western White spruce right from the lumberyard. Whenever I see a good 2x4 (or any other size) that's clear and straight-grained, I buy it and add it to my stock. Any softwood is a candidate for your building board, especially if you have a table saw or radial-arm saw. People have told me that they won't use red or yellow cedar because of its high oil content. I've used both, and I've had no problem with either. Find out what types of wood are available in your area: you may be surprised at what you find. Look for boxwood or pattern pine; both are great for our purposes.

GUSSETS

If you're familiar with my articles, then you know the word "gusset" well. I'm a firm believer in making everything as strong as possible. (Occasionally, I overdo it.) I highly recommend using gussets at the joints between pieces of stick stock (i.e., the fuselage construction). I save all my light plywood scraps and cut them up to make gussets. They add considerable strength to the butt joints in fuselage structures, and the additional weight is negligible, even in a large fuselage. Good-quality, thin plywood can be easily cut with a modeling knife, a pair of scissors, or with a hinge-blade, office paper cutter. I use the last of these, and it turns out dozens of properly shaped gussets in short order.

OTHER MATERIALS

I make fiberglass sheeting to simulate metal skin. It's easy to do, and you probably have most of the material on hand. Here's what you need: glass-cloth (it comes in a variety of weights and thicknesses), resin, hardener, release agent, color (optional) and a sheet of plate glass. (I buy salvage plate from a glass shop.) Coat the glass with release agent, and then lay a piece of glass cloth of the appropriate size and weight on the glass. Cover it with catalyzed resin, using enough resin to fill the pores in the cloth. Spread it evenly, and let it cure. (Don't catalyze too heavily; a slower cure is stronger and allows the resin to spread evenly before it starts to set up.) Once cured, the cloth can be removed easily from the plate glass, leaving the side that was against the glass absolutely smooth. The sheeting can be cut into panels and fastened in a pattern that matches the original airplane, or, like any covering, it can be detailed with panel lines and rivets. A variety of glues can be used, and, if you can devise a way to hold the sheeting in place while the resin cures, it can even be attached with catalyzed resin.

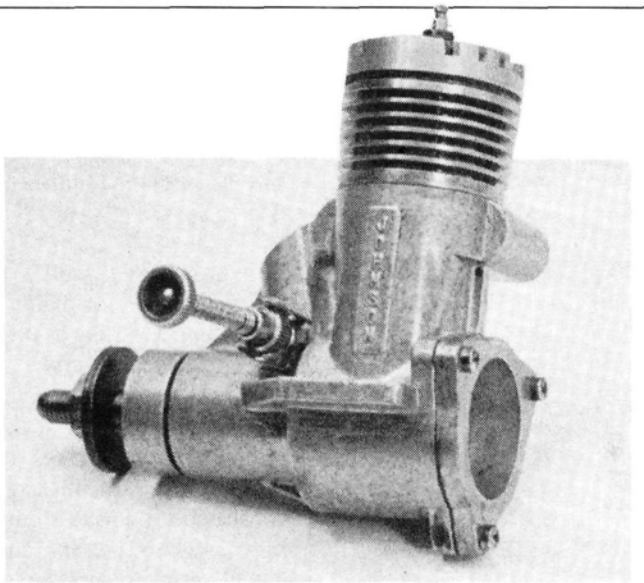
Next month, I'll have some more building tips for that large model in your future. Many are aimed at the plans builder, but they all apply to any construction project, plan, or kit.

**Here's the address that's pertinent to this article:*
***Dick Say, Aero Plans' N Parts,** P.O. Box 939, Olean, NY 14760.* ■

ABOUT THOSE ENGINES

Lubrication, preserved fingers and fuel transfer

by JOE WAGNER



A great-running Johnson-built .29 like this one became scrap metal when I ran it on "dry-film" lubrication, without any oil.

OF ALL THE VARIABLES affecting model engine operation, lubrication is probably the most misunderstood. Too many R/C fliers consider the lubricants in model fuels an annoyance to be minimized. Their philosophy is that the lower the oil content, the greater the fuel's power output—and the less oily the mess they have to clean off their airplanes. These modelers prefer synthetics to castor oil, which is difficult to wipe away.

I've received letters from readers asking why glow fuel needs so much oil in it, while the 2-stroke engines used in weed-eaters and leaf-blowers can get by with 20:1, 32:1, 40:1, and even higher fuel-to-oil ratios. The main reason for the different ratios is power output. Model airplane motors develop more horsepower for their size than any other internal-combustion engine. All engines waste most of their fuel's energy in heat and, since model engines are so powerful, they also produce an unusual quantity of waste heat.

Excessive heat can cause erratic combustion, unequal expansion of moving parts, and increased frictional losses. These factors reduce power output, reliability and engine life. To minimize such adverse effects, we're forced to use much more oil in our fuel than the mild-mannered leaf-blower motors require.

The oil does two jobs:

- It performs the obvious function of separating moving surfaces with a thin, slippery film, minimizing friction reducing heat loss.
- The oil in model fuel acts as an effective coolant by absorbing and carrying heat away from the metal surfaces inside a model engine. (The cooling oil used in machine-shop operations works in the same way.)

This cooling function is far more important than most modelers realize. Years ago, when I was doing engine "hop-up" work for competition fliers, I wondered about the prac-

(Continued on page 100)

For lubricating 2-stroke model engines, castor oil has no equal. Want confirmation? Ask my old friend Duke Fox.

CLEAR THE PROP!

Imagine a power lawn mower with no shield around its blade. Would you be willing to tinker with its carburetor adjustment while it was running? I wouldn't—yet we routinely adjust our engine needles, with our fingers, within a fraction of an inch of the whirling prop blades. Many modelers are hurt doing this.

Then why aren't today's model airplane motors equipped with flexible needle-valve extensions? Several famous engines of yesteryear like the Super Cyclones, K&B Torpedoes and McCoy Redheads, were equipped with this type of extension. With a flex needle you can keep your fingers away from the prop when adjusting it and, for fully cowled motors, needle extensions can't be beat! Who'll be the first to reintroduce this much-needed item?

FOAM FLOATS

(Continued from page 21)

midline, I had to apply the top glass with spray adhesive to make sure it would adhere to the sides (when wet), all the way around to the bottom shear. With an extra pair of hands, only a little lifting and repositioning was required; the cloth was positioned smoothly and conformed very well.

Rough-sanding the Kevlar was a nightmare, however! Kevlar fibers are so tough that it's possible to sand the cured epoxy resin out of the matrix and leave billions of tiny Kevlar hairs sticking above the surface! A subsequent coat of epoxy resin left the surface looking like 20-grit sandpaper!

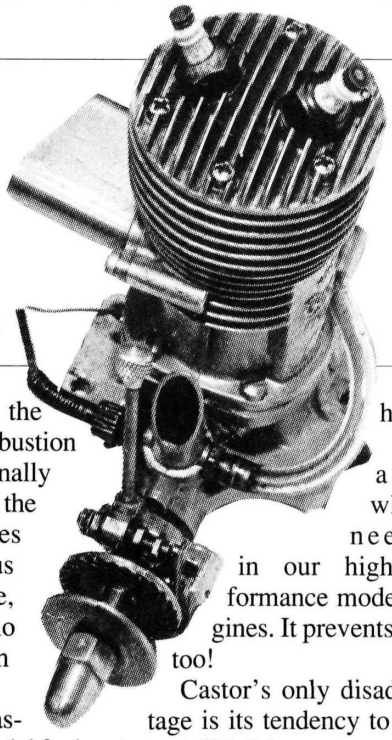
My salvation was a small, hand-held Surform planing tool. Its hundreds of razor-sharp edges allowed me to shear off the Kevlar fibers at the same rate as I removed the cured resin. After several hours of light shaving with the Surform, I had a surface that could be primed and wet-sanded without raising the fuzz again. Kevlar cloth is best used as a base in a typical "layup" to keep it away from the surface that has to be sanded.

BACK TO THE PROJECT

Let's return to our sport-float glassing project and apply the final filler coat. In the past, I've used microballoons and epoxy in a 50:50 mix. This works well, but the microscopic glass spheres quickly wear out the sandpaper. I recently discovered West Microlite Filler, which I think is far superior. Microlite is tan and has a consistency like that that of talcum powder. It's twice as absorbent as microballoons, and it can be mixed with resin at such a high ratio that it's possible to

(Continued on page 101)

ABOUT ENGINES



This 50-year-old Super Cyclone .65 has a feature that today's R/C motors could use: a flexible needle-valve extension. (Modern makers please copy!)

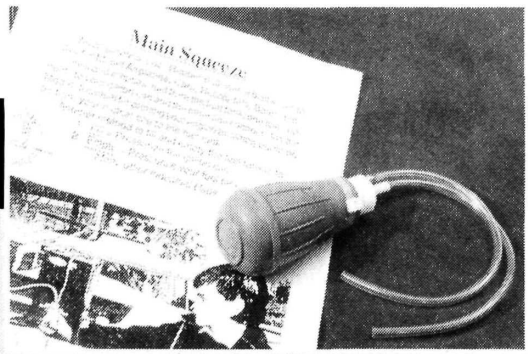
ticality of "dry lubricants" such as molybdenum disulfide and graphite for model-engine use. As a test, I carefully treated all the moving parts of a Johnson .29 with a moly-based "dry lube" used in high-temperature aerospace applications. I turned the assembled engine over at a low rpm in a lathe for half an hour to wear-in and burnish all the mating surfaces. I then rinsed out the powdery residue, and ran the Johnson a few times on regular glow fuel. Then came the crucial test! I filled the tank with a 4:1 blend of methanol and nitromethane; no oil at all. The Johnson started with a scream, and was a hopeless pile of junk in less than 10 seconds! I couldn't even determine what failed first...oil is a necessity in model fuel!

By looking at model-engine lubrication analytically, you can see that the percentages are misleading and there isn't too much oil sloshing around in our motors. Say that you're using a glow fuel with a 30-percent lubricant content. That seems like a lot, but since the fuel-to-air ratio is 7:1, a glow engine only breathes in roughly 4 percent of the lubricant at each piston upstroke, and of this, very little ever comes into contact with the metal-to-metal moving surfaces! It's suspended in microscopic droplets within the case, then the combustion chamber, and it finally passes out through the exhaust. It carries heat away, and thus serves a purpose, but it's had no chance to function as a lubricant.

I like to have castor oil in all my model fuels: spark, diesel and glow. Castor has the unique property of gaining viscosity as it's heated exactly what's needed in our high-performance model engines. It prevents rust, too!

Castor's only disadvantage is its tendency to congeal if left in or on a motor for any length of time after running. This gums up the ball bearings and causes cylinder "varnish" These problems are easily avoided, however, by using "after-run" oil. Even readily available products like 3-in-1 and WD-40 do an excellent job of rendering castor oil residue harmless if they're applied copiously after each flying session.

Here's the address of the company mentioned in this article:* ***Argo-USA,* *3229 Dianora Dr., Palos Verdes, CA 90274.* ■



The ultimate in rubber-bulb fueling equipment: Argo-USA's "Main Squeeze." Note the positive retainer at the bulb base.

NO VOLTAGE REQUIRED

Argo-USA* makes a clever variation on the familiar rubber fuel bulb. Called "Main Squeeze," it has separate pressure and vacuum lines, with a check valve on each. Once you produce pressure (or vacuum) with the bulb, the check valve prevents back flow.

Besides its obvious use for fueling and de-fueling, I've used my "Main Squeeze" for inflating air wheels, blowing out clogged needle valves and pressurizing fuel tanks for leakage tests.

Argo-USA's owner, long-time modeler John Targos, says that in all the years that the "Main Squeeze" has been on the market, he has never received any complaints. It's regularly used for all three types of model fuel, too: gasoline-based, glow and "diesel." John warns, however, against storing any kind of fuel in the bulb for more than a few days, because prolonged exposure to raw fuel could cause bulb deterioration.

FOAM FLOATS

(Continued from page 99)

feather-sand a cured layer that's adjacent to bare foam!

Whichever filler you use, apply a coat that's the consistency of thick batter and isn't "brushable"; the resin/filler mixture shouldn't run when applied to a vertical surface. Once again, it's best to apply the filler coat to the float tops first; do the bottoms after the top has cured. A spatula or squeegee is the best tool for applying the filler coat. Work the resin/filler mix around, pressing it into the glass, and strike off as much excess as possible. Remember: this final coat adds little strength to the float, so if you put it on thickly, you're only adding weight.

FINAL SANDING

When the filler coat has cured, you can begin the final sanding. Start with 100-grit paper wrapped around a sanding block, progress to 120-grit, hand-held, and finish with 220-grit (or more). Epoxy resin can be sanded beautifully, and it shears off in a white powder that won't build up on the sandpaper. *Caution:* always work in a well-ventilated area when using epoxy. It has almost no odor, so it's impossible to tell if you're getting a dose that might prove harmful. Play it safe.

When you can see the weave of the glass-cloth in the float's surface, but not feel it (or any other irregularities), the final sanding is complete. Before you mount the floats, just apply a primer coat or two, finish-sand, and add a fuel-proof color coat. You can start a pair of floats on a Monday, have them painted by Friday, mount them on Saturday and be ready to fly on Sunday!

Because of their ease of construction, minimal covering time, durability, complete lack of voids and comparable

(Continued on page 104)

FOAM FLOATS

(Continued from page 101)

weight, glassed foam-core floats are superior to any other type that's available. Some effort and expense is involved, but the product makes all the sweat and time worthwhile!

**Here are the addresses of the companies mentioned in this article:*
***Sig Manufacturing Co.,** 401 S. Front St., Montezuma, IA 50171.*
***K&B Manufacturing,** 12152 Woodruff Ave., Downey, CA 90241.*
***PEC's Hobby Supplies,** 947 Stierlin Rd., Mountain View, CA 94043.*
***West System Epoxy, Filler & Carbon Fiber,** distributed by John Sullivan Model Float Products, 1421 Second St., Calistoga, CA 94515.*
***Spray & Stick,** distributed by John Sullivan Model Float Products.* ■

THE BEAST

(Continued from page 27)

discussed the virtues of the Beast's many configurations and then drew up and built the *best* of the Beasts, which I was invited to fly while standing on a rolling dock in front of 3,000 people.

After its last metamorphosis, the Beast has a sheeted, constant-chord foam wing and a sheeted-foam float. The fuselage, fins and downstruts are of either mahogany or poplar ply, depending on strength requirements, while the rudders, pitch damper and other miscellaneous parts are of balsa.

The air/water rudders run off a pair of Sullivan* pushrods linked to a single servo, and the elevons are pushed around by a two-servo, sliding-tray arrangement. The engine is mounted perpendicular to the fuselage, but it's offset to counteract torque. The entire model is covered with MonoKote*, and when you pick up the Beast (by its handle!), you notice that it's light and tough.

The Beast's water handling is excellent. Its dual rudders can turn it smartly, even out of a crosswind, and it has a positive steering feel on dry land. The tip floats keep the wing tips up and out of the water in sharp turns; and the slightest application of power gets the wing working with the plane sitting upright on the pylon float while maintaining a straight, true course. In any contest, the Beast would get high marks for maneuvering around buoys.

TAMING THE BEAST

Two methods of control are available to tame the Beast or to turn it loose:

- Set the control-surface throws for mini-

mum deflection by moving out on the control horns until you get used to flying the plane. As you gain confidence, gradually reset the clevises closer in to increase throw.

• More conveniently, you can install a radio with dual rates. Ed's Clearlake Beast had the dual-rate setup. After taxiing around to get a sense of how the Beast looked coming and going, I asked for some tips on takeoff procedure and Ed replied, "Point it into the wind and give the throttle a push."

The Saito* .50 pulled the Beast out of the hole, the floats hopped across a couple of waves, and the thing was flying! I hadn't touched rudder, elevator, or aileron! The first turn was accomplished with aileron only and slight elevator halfway through to keep the nose up. After a couple of turns around the circuit, I felt completely at ease. The Beast flies very smoothly at low speeds, and its ungainly looks belie an almost perfect flying machine. The only plane I've ever flown that comes close to it is the Omni Models Ultimate Trainer.

About halfway through the flight, Ed reached over and, without asking me, threw the high-rate switch. At this point, the Beast became very direct and positive, but even in this hyperactive mode, I never had the feeling I would lose it. I have some planes that I've flown for years, and I occasionally decide to "not fly pretty" and bash them around, knowing they'll come to no harm. The Beast gave me the same feeling: just slam it around, work out your aggressions, and have a ball!

The landing was accomplished at high rate and crosswind. Once again, Ed was very helpful: "Just cut the power and let it come down"! Slight right aileron kept the wing flat, and the Beast settled in and taxied almost to a stop before resting on its downwind tip float. As I was taxiing it back to the dock, I told Ed that the Beast was too good not to kit. Always a man of few words on complicated matters, Ed replied, "That's fine with me, but you do it!"

So, that's what's happening. Jim McDanald (my partner in the Sullivan Float Products empire) and I will be busy cutting and boxing parts for the first 100 Beasts with a release date set for early December. Will the Beast revolutionize sport-seaplane design? At this point, it's difficult to tell, but I can tell you that Ed Westwood and Paul Weston have done their homework, and relaxed fun is the name of this Beast's game.

**Here are the addresses of the companies mentioned in this article:*
***Ed Westwood,** 909 South 173rd, Spanaway, WA 98387.*
***John Sullivan Float Products,** 1421 Second St., Calistoga, CA 94515.*
***MonoKote; distributed by Top Flite Models,** 2635 S. Wabash Ave., Chicago, IL 60616.*
***Saito; distributed by United Model Distributors,** 301 Holbrook Dr., Wheeling, IL 60090.* ■

THE BEAUTY

(Continued from page 27)

Bill sprayed his prototype Canadair with automotive lacquer in appropriate colors, followed by protective topcoats of clear Imron. The model looks very striking, and there's always a hush of admiration when Bill pulls it out of his truck at the lake. This one gets everyone's attention!

Bill always stresses the importance of reliable engines and *identical* linkage and tank setups for twin-engine operation. Each of the prototype's O.S.* 40FS engines were bench-run for an hour before final installation, and the needle valves are backed-out and fine-tuned before each flight.

CANADAIR CAN DO!

Canadair takeoffs are straight and very positive. The combination of a large fuselage, efficient, low, dead-rise bottom and stock spray rails produces little, if any, spray, and the two .40s swinging three-blade Grish Tornado 9x6s pull the CL-215 into the air with absolute authority. Bill suggests that all prospective Canadair pilots should have at least average, flying skills to handle yaw if one engine leans out. When comparing the three planes in his lineup, Bill says that the PBY requires the most attention, particularly on landing flare; the Albatross flies like a well-behaved pattern ship; and the Canadair occupies the middle ground.

Canadair landings are almost anticlimactic—just lower the flaps and reduce power. You can rely on aileron control right up to touchdown. A dreamer might be tempted to let the CL-215 fly off into the sunset on some imagined fire-fighting mission. The sound of those twins humming in unison is mesmerizing, and the sight of the Canadair tracking straight

(Continued on page 106)

MODEL AIRPLANE NEWS

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AL'S R/C SUPPLIES
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- UPS orders shipped daily
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- Now available "Fastcover" covering material
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BOB FIORENZE HOBBY CENTER, INC.
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FAX (407) 327-7148

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Chicago's largest hobby shop. R/C planes, helicopters, boats, and cars. R/C Repairs, installations, and custom building. Mon.-Fri. 10-9; Sat. 9-6; Sun. 11-4.
STANTON HOBBY SHOP, INC.
4734 Milwaukee Ave. **283-6446**

NEW JERSEY—Red Bank
Full-line hobby shop. Ask us, we will compete with mail-order prices. Mon.-Wed. 10-6, Thr. Fri. 10-8, Sat. 10-5, Sun 12-4.
HOBBYMASTERS
62 White St. **842-6020**

OHIO—Findlay
Findlay's local R/C dealer, planes—cars—boats. We specialize in R/C, large selection of kits, accessories, and parts. We are authorized Sig and Dremel dealers. Also sell plastic kits and model rockets. Tue. & Thu. 3-9, Mon., Wed., Fri., & Sat. 10-9.
JINX MODEL SUPPLIES
721 Rockwell Ave. **422-5589**

OKLAHOMA—Tulsa
R/C Specialists, planes, helicopters, cars and boats. We also have kites, boomerangs and plastics. Experienced personnel to answer all your questions. AE, Visa, MC. Hours: Mon.-Sat. 10-6, Thurs. 10-8.
WINGS 'N THINGS HOBBY SUPPLY, INC.
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TEXAS—Austin
Austin's largest hobby shop. Complete line of R/C airplanes, gliders, cars, boats, helicopters, parts & accessories, rockets, kites, R/C systems. Centrally located. Open 7 days a week.
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R/C airplane specialists, R/C cars, boats, helicopters. Plastic models, rockets, trains, HO & N. "Toys for Big Boys." Mon.-Fri. 11-7, Sat. 10-6.
LARRY'S HOBBIES
156-F FM 1960 E. **443-7373**

LATIN AMERICA
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Complete line of R/C airplanes, cars, boats, and helicopters. Parts and professional expert service and advice. Julio Pastura, President. Weekdays 4-10 p.m.
EL HOBBY SHOP
Centro Commercial, San Jose 2000
Apartado 529, Centro Colon **32-26-81**

Send sales message and payment to **Model Airplane News Hobby Shop Directory,** 251 Danbury Rd., Wilton, CT 06897.
For further details or information on our special introductory offer, call toll-free 1-800-243-6685 and ask for Katherine Tolliver.

THE BEAUTY

(Continued from page 105)

away from you is hypnotic. It's almost a crime to turn it and bring it back. I suspect that many of Bill Price's Canadairs will be built and flown repeatedly by their proud owners; and I extend a hearty welcome to this new member of modeling's growing fleet of scale floatplane kits.

**Here are the addresses of the companies mentioned in this article:*
***G&P Sales,** 410 College Ave., Angwin, CA 94508.*
***O.S.; distributed by Great Planes Model Distributors,** 1608 Interstate Dr., P.O. Box 4021, Champaign, IL 61820.* ■

QUIET FLIGHT

(Continued from page 34)

types of radio that were becoming available. I found this amusing, and hope you do, too!

Definition of Available Modes of Radios

Note: Modes apply only to two-stick transmitters where the rudder function may be on either side.

Mode I has aileron and throttle on the right stick, and rudder and elevator on the left stick. Mode II has aileron and elevator on the right stick, and rudder and throttle on the left stick. Mode I and Mode II are also available in left-handed versions with the stick functions reversed. Mode III has crossed trim functions; Mode IV has push-buttons for throttle; Mode V has auxiliary channels on the side; Mode VI has auxiliary channels on the top; Mode VII has no on/off switch. Mode VIII has only a 30-day warranty, and Mode IX has been discontinued. À la mode has chocolate on the left and vanilla on the right, while Comm-Mode is iden-

tical to Mode IX except that any lever you pull flushes the transmitter. All of these are available with rate switches, mixing and exponential options, which add considerably to the price tag and require eight fingers on each hand to operate. Because modern transmitters are heavier, many manufacturers offer new accessories like neck straps, transmitter trays and frequency-color-coded trusses.

KRC ELECTRIC FLY

One of the most famous electric events, the KRC Electric Fly, will take place at Buc-Le Aerosportsmen Flying Field in Quakertown, PA, on September 15 and 16. This two-day weekend event is an open Fun Fly that also includes awards for: Most Rolls in 60 Seconds, All Up/Last Down, Most Loops in 60 Seconds, Maxi-Flight, Best Kit Trainer, Best Original Aerobatic, Best Old-Timer, Best Gas Conversion, Pilot's Choice, Best Kit Aerobatic, Best Kit Sailplane, Fastest Aircraft and Most Imaginative Kit Variation.

There will be a Saturday Night Social Dinner Buffet open to all participants and their families. If you like electrics, this is the event to attend. Now in its eleventh year, the KRC Electric Fly attracts the best electric models in the U.S! For more information, contact Bob Lane at (215) 234-4104.

TNT 1990

The Soaring League of North Texas presents the Texas National Tournament 1990, at the University of Texas Dallas Campus in Richardson, TX, on September 8 and 9. The Two-Meter and Open will be flown in both Sportsman and Expert classes. Awards will be presented through to 5th place in all classes, and the tasks will last 7 minutes with a landing-

(Continued on page 111)

QUIET FLIGHT

(Continued from page 107)

point bonus. The Two-Meter will be flown on Saturday and the Open on Sunday. This event is open to pilots from all states. For more information, contact Chuck Fisher at (214) 270-2634.

TORREY PINES SCALE SLOPE SOARING FUN FLY

The 2nd Annual Torrey Pines Scale Slope Soaring Fun Fly will be held at Torrey Pines (just north of San Diego, CA) on September 1, 2 and 3. The event is open to all scale sailplanes—modern or vintage—and power scale slopers. Included in the entry cost are a Saturday Night Social and a Sunday Night Banquet with raffle and presentation of the Pilots' Choice Award. This was one of last year's premier US glider events! If you have a passion for scale sailplanes or power scale slopers, you won't want to miss this event! Over 100 aircraft showed up last year, and even more are expected this time. For further information, contact Jerry Miller at (619) 450-1483, or Charlie Morrey at (213) 494-3712.

Till next time...good thermals and a full charge!

**Here's the address of the company mentioned in this article:*
***JM Lupperger Plans,** 947 Joann St., Costa Mesa, CA 92627.* ■

SPORTY SCALE

(Continued from page 46)

ing about next year's event. Top Gun '91 will be held at the Palm Beach Polo Club in West Palm Beach, FL. It's about 40 miles north of Fort Lauderdale, 60 miles north of Miami, and 150 miles south of Orlando, on Florida's east coast. The nearest airport is Palm Beach International.

The dates are Thursday through Sunday, May 2 through May 5. This is the same Palm Beach Polo Club that Prince Charles and Princess Di frequent. It's an outstanding site with permanent bleachers for thousands of spectators, and everybody has a fantastic view. In fact, if you went to the top row, you could look *down* on the field and see some exciting takeoffs and landings. The facilities are great, and accommodations are available on a first-come, first-serve basis. These one-, two-, or three-bedroom condos have

(Continued on page 116)

PRODUCT NEWS

Descriptions of new products appearing in these pages were derived from press releases by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by **Model Airplane News**, or guarantee product performance. When writing to the manufacturer about any product described here, be sure to mention that you read about it in **Model Airplane News**.

DYNAFLITE "Fun Scale" F4U

Dynaflite is pleased to announce the new "Fun Scale" F4U. The all-balsa Corsair has a 52-inch wingspan, 569 square inches of area, and a wing loading of less than 25 ounces per foot. Its all-up flying weight is between 5 and 5 1/2 pounds, and it requires a 4-channel radio and a .40 to .50 2-stroke engine. The kit includes all the usual hardware, Zip-Horns, a clear plastic canopy and a custom "Dynaflite Fun Scale Corsair" pressure-sensitive decal sheet.

Price $99.95

For more information, contact Dynaflite, P.O. Box 1011, San Marcos, CA 92069.

HIROBO VERTOL KV-107II

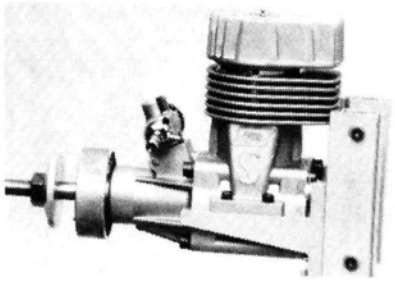
Want to own the star attraction at your flying field?—try the Hirobo VERTOL KV-107II scale model helicopter. The VERTOL KV-107II is a fabulous scale model of a tandem-rotor helicopter used by the U.S. Marines and the Japanese Self-Defense Forces. It has multiple-blade tandem rotors, a toothed belt-drive system, and a detailed, fiberglass-reinforced plastic (FRP) fuselage.

The VERTOL is designed to use a single .35-size engine to drive both the front and rear rotors through a toothed belt, on which the tension is adjustable. The chassis is a light aluminum frame on which all the mechanical parts rest. The tandem-rotor drive system uses an autorotation clutch as standard equipment, as well as a control mixing system to let a 5-channel R/C system work efficiently with one to three gyros.

The FRP body is remarkably light, but detailed. With the kit's accessories, decals and clear instructions, you can build a unique, attractive and "flyable" 1/50-scale model helicopter.

Part no. 0406902 (assembly without engine)

For more information, contact Altech Marketing, P.O. Box 391, Edison, NJ 08810.



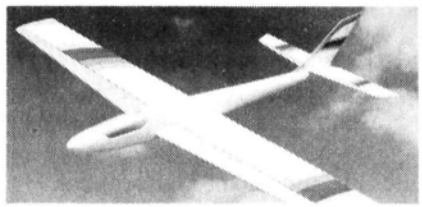
SOFTWARE ASSOCIATES SoftMount Engine Mount

Software Associates presents SoftMount, a revolutionary new engine mount that's specifically designed for model aircraft. With its unique arrangement of elastomeric elements—which ensure secure, yet soft, mounting of the engine to the airframe—this mount isolates engine vibration. Thrust forces don't cause the SoftMount's elastomeric elements to be loaded in tension (as is the case in other mounts), and their special design prevents large engine movements at idle speeds and excessive thrust-line deflection during high-G maneuvers.

A key safety feature is the SoftMount's *capture feature*; in the unlikely event of an elastomeric failure, the engine will remain safely in place and won't separate from the aircraft. A variety of sizes are offered for mounting .40 to 65, .70 to 1.1, and 1.2 to 1.8 cubic-inch engines, either radially or on beams.

Price: $21.95 to $31.95

For more information, contact Software Associates, 10319 Pine Pass Dr., Houston, TX 77070.



DOUGLAS AIRCRAFT MODEL AVIATION Slope Kit

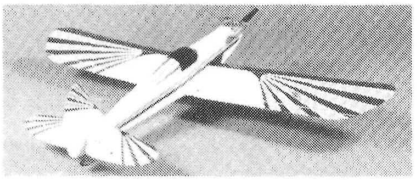
Douglas Aircraft Model Aviation released its first slope kit—the 43-inch Silhouette—just over a year ago. The Quicksilver, a 52-inch slope glider, is essentially a scaled-up version. It retains the snappiness and maneuverability that made the Silhouette popular, but because it's larger, it's a suitable beginner's aileron ship.

The Quicksilver design features the new Selig/Donovan 6060 airfoil, thinned to 8 percent at the root and with its camber modified at the tip to improve inverted performance. The kit includes clean, balsa-sheeted, foam-core wings with hardwood leading- and trailing-edge stiffeners. The plywood fuselage is reinforced with a hardwood nose block, and 3/8-inch balsa triangle stock along the full length adds strength and makes its shape pleasing.

The Quicksilver flies any maneuver (inside or outside) that can be done without rudder and/or motor, yet it's tame when flown "light" and trimmed back. It easily accepts full-size radio gear and a 500mA battery.

Price: $78.95

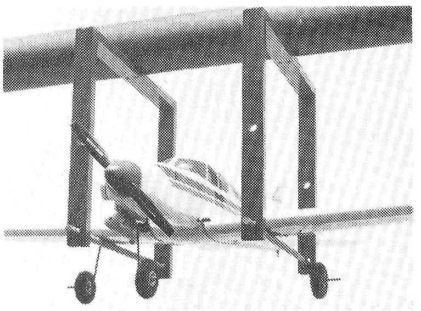
For more information, contact Douglas Aircraft Model Aviation, P.O. Box 92472, Long Beach, CA 90809.



HOBBY DYNAMICS
Sportee 40

Hobby Dynamics' new Sportee 40 low-wing sport plane comes complete with all hardware, full-size comprehensive plans and a photo-illustrated instruction book. This 3 1/2-pound plane performs many aerobatic moves, and it instantly recovers from spins and snaps. The Sportee 40 not only looks great, but it's also specially designed to provide stable flight characteristics at a variety of speeds. It can even fly backwards in 10mph winds! Assembly takes 8 to 12 hours. The Sportee 40 is made in the USA and is available at your hobby store.

For more information, contact Hobby Dynamics, 4105 Fieldstone, Champaign, IL 61821.



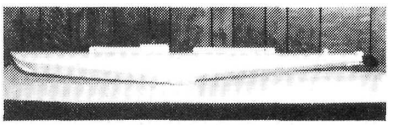
HOBBY HANGAR
Model Storage Device

Gone are the days of using ceiling hooks, bungee cords and fishing line to hang up your valuable models! With the Hobby Hangar, you can create a recharging station high off the floor. This keeps your model safe and frees valuable floor space (charger and extension cord not included). This versatile product will safely store just about any R/C model, yet it can be removed in seconds!

Manufactured using the best kiln-dried lumber available, each Hobby Hangar is precision-crafted with routed joints that make it easy to assemble and give it excellent weight-handling capabilities. The Hobby Hangar comes unfinished, but it takes a stain or spray paint beautifully!

Price: $12.95, plus shipping and handling.

For more information, contact Hobby Hangar, P.O. Box 308, Shingle Springs, CA 95682.



KIRCHER R/C PRODUCTS
Foam-Core Floats

Kircher offers a complete line of airplane floats that range from 31 inches long (for 4- to 6-pound airplanes) to 48 inches long (for 24- to 30-pound planes.) These floats have a rounded top to reduce drag and a vee-bottom for smooth takeoffs and landings in any water conditions. All six sizes are light, unsinkable and virtually unbreakable at the step and mounting locations owing to the plywood plate that runs the entire length and depth. The floats are available as kits (all pre-cut foam supplied), or plans, and complete instructions and full-size, computer-drafted illustrations are included. Available by direct order only. Send for a catalogue.

For more information, contact Kircher R/C Products, Inc., 9 Sheffield Way, Clark, NJ 07066.

THUNDER TIGER
Super Mosfet Power Panel

Thunder Tiger's new Super Mosfet Power Panel is the ultimate in flying convenience, efficiency and safety. High efficiency is possible because the Mosfet drivers operate on demand, and there's no battery drain when they're not in use. Features include: a rear, protective, plastic cover, which prevents short circuits and dirt contamination; 6V fuel-pump jacks (with plugs); in/out fuel-pump direction switch; push-button on/off fuel-pump switch; 12V starter and fuel-pump jacks; glow-plug output jacks (with plugs); easy-to-use current-adjustment knob with analog ammeter.

Part no. 110439

Price: $39.95

For more information, contact Global Hobby Distributors, 10725 Ellis Ave., Fountain Valley, CA 92728.

G&P SALES
Canadair CL-215

This Canadair model is a scale rendition of the Canadian-built, full-size fire bomber that was first produced in 1967. The plans were drawn from factory-supplied drawings, and the only deviation from exact scale is the airfoil, which is undercambered on the full-size plane. Like the full-size CL-215, the model uses a flat-bottom airfoil with single, slot-type flaps.

The fuselage is made of polyester fiberglass using a combination of 1-ounce mat and 10-ounce cloth. It's light, but adds rigidity on the bottom of the hull for water landings. The wing, horizontal stab, elevator, vertical stab and rudder are made of 1/16-inch balsa-covered foam cores. The foam-cores come pre-cut and pre-slotted for the main spars.

The kit includes all the wood you'll need to build this aircraft. The floats, wing tips, stab tips and rudder tips are solid balsa, and there are two wing spars. The cowls and engine nacelles are vacu-formed 1/16-inch polystyrene. Two 10-ounce tanks fit into the nacelles right behind the leading-edge spar.

The plane flies realistically and has a low stall speed with the flaps down. With its high-aspect-ratio wing, it even does well with the flaps up. Specifications: wingspan, 81 inches; length, 55 inches; wing area, 891 square inches; weight, 13.5 pounds; engines, .40-cubic-inch 2-stroke; radio, 6-channel; flaps, single slot; landing gear, for taxiing only.

Price: $269.95, plus shipping; landing-gear kit, $179.95.

For more information, contact G&P Sales, 410 College Ave., Angwin, CA 94508.

SPORTY SCALE

(Continued from page 111)

fully equipped kitchens with all the services of the Polo Club at your disposal. Normally, prices start at $200 a day, but for Top Gun, a one-bedroom condo will be available at less than $100 a night, and just like last year, there are less expensive hotels within 15 minutes of the club. Also, I'm working with a major airline to cosponsor the event, and I hope to get you some great airfares to West Palm Beach. I'll keep you posted.

Well, you maniacs, that's all for this month. You may be aware that Colonel Stunning is back on active duty and that Sergeant Atwood has taken his place here at *MAN*. I've never worked under the command of a Staff Sergeant before, so this may be interesting. He'll need all the support we can give him—that means no nasty letters until he has completed at least three full issues. Until then, I strongly suggest that you do as I do and keep checking that six!

**Here are the addresses of the companies mentioned in this article:*
Hangar One, *1402 Madison Ave., Montgomery, AL 36107.*
Nick Ziroli Models, *29 Edgar Dr., Smithtown, NY 11787.*
O.S./Great Planes Model Distributors, *1608 Interstate Dr., P.O. Box 4021, Champaign, IL 61820.*
Don Smith Plans, *2260 N. Dixie Hwy., Boca Raton, FL 33431.*
Zenoah; *distributed by World Engines, 8960 Rossash Ave., Cincinnati, OH 45236.*
Aeroloft Designs, *8716 S. Roberts Rd., Suite 1A, Hickory Hills, IL 60457.*
Pacer Technology/Frank Tiano Enterprises, *2460 SW 85 Terrace, Davie, FL 33324.*
Violett Supply, *1372 Citrus Rd., Winter Springs, FL 32708.*
Williams Brothers, *181 Pawnee St., San Marcos, CA 92069.* ■

BELLANCA P-200-A

(Continued from page 54)

they sandwich the rudder blade. Each has a tab bent to serve as a horn, and a through-bolt that holds the blade but allows it to kick up. Glue the staples into grooves in the center of the float tops and bottoms. Install and test your radio; then remove it. (I used a Futaba* Conquest.)

Coat the entire framework—inside and out—with clear dope, and cover with the film or fabric of your choice. I covered all surfaces except the tops of the main wing and fuselage with polyester-chiffon dress fabric. I pull it tight, put a bead of

(Continued on page 119)

CLUB OF THE MONTH

THE THUNDERBIRDS R/C CLUB
P.O. Box 100172, Fort Worth, TX 76185

A lot of clubs complain that nobody contributes to the newsletter, participates in events, or helps care for the field. October's Club of the Month—the Thunderbirds of Fort Worth, TX—is a refreshing exception. Sure, sometimes few people write for the newsletter, but the issue of "The Pilot's Log" we saw looks great! It has cartoons, contest coverage—even advertisements!

The members have plenty of club spirit and enthusiasm for the hobby. They're preparing for the Hot Mac Annual Fun Fly in Waco, TX, the 2nd Annual Thunderbird Airshow and—the biggie!—the Scale Masters Championships in Irving in September. The Thunderbirds not only run club contests and take care of the field (Bill Slater won "T-Bird of the Month" for cleaning up after the big flood; others have volunteered to fix up the runway), but they're also helping to organize the Scale Masters!

The South *is* known for its hospitality. The Golden Triangle Club gave the Thunderbirds a place to hold its annual Jumbo Fly In when its field was closed. Despite bad weather, 27 fliers attended, and Ken Spears won Best Civilian (with his 1/5-scale Pica Waco) and Pilot's Choice (for his 33-pound PT-19).

The club recently held another successful event—its 1990 Picnic and Fun-Fly, which consisted of three events: a timed taxi race, a bomb drop and spot landings. Don Bell and Keith Sullivan held a flight show with their ducted-fan F-15 Eagles, and there was a "canopy-catching contest." What's that?—everyone chases the canopies after the wind takes them! The damage was minor, but Charles Lapinski's canopy cover got a skylight courtesy of the field signpost!

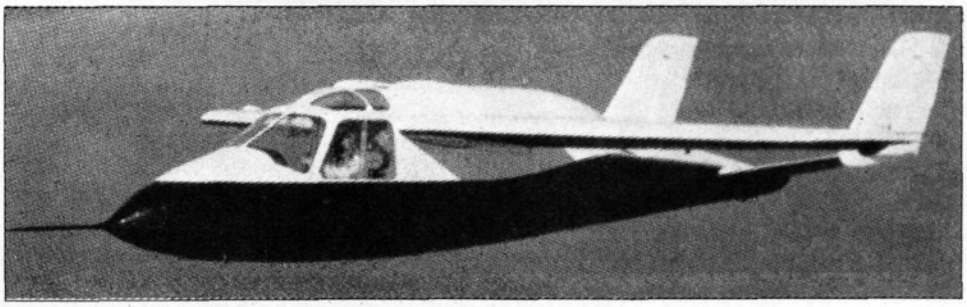
After the competition, the lucky 1st- and 2nd-place winners received the ceremonial ice-chest dousing! What a group! This sums it up: "It was a great day for a picnic, with new and veteran Thunderbirds and their families."

Keep up your enthusiasm for the hobby, Thunderbirds. We're sending you two free subscriptions for being *our* Club of the Month, and for showing us how it's supposed to be done! ■

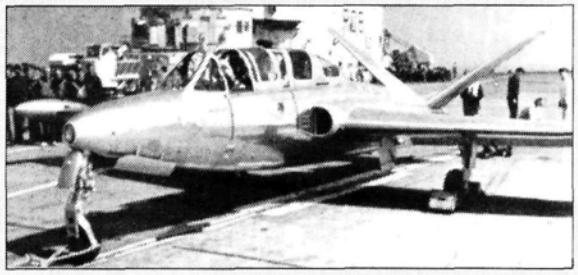
NAME THAT PLANE

CAN YOU IDENTIFY THIS AIRCRAFT?

If so, send your answer to Model Airplane News, **Name the Plane Contest** (state issue in which plane appeared), 251 Danbury Rd., Wilton, CT 06897.



You're all getting very sharp! Twenty-five of you identified our August airplane as a Fouga CM-170 Magister, and this was close, but no cigar! Darwin Evelsizer of Mascoutah, IL, was one of the 25, and he even questioned the sliding canopies, saying that Magisters had side-opening "clam shells" fitted as standard. The canopies, background and nose gear all provided clues that the airplane was, in fact, a Fouga CM175 Zephyr—the naval version of the Magister. In spite of our attempts to be tricky, we received nine correct answers, and congratulations go to Nevin E. Alley of Cuyahoga Falls, OH, whose name was the first drawn from that knowledgeable group.



The Zephyr's dimensions were similar to those of the Magister, but it was slighly longer and had a slightly larger span. Beyond this, the differences were the result of tailoring the design for its naval training mission. A tail hook and catapult gear were added, and the landing gear was considerably beefed-up to absorb the increased punishment of carrier "arrivals." The prototype first flew on July 31, 1956, and the first production aircraft flew nearly three years later. Although Zephyrs are rather rare (fewer than 35 were delivered), its more numerous predecessor, the Magister, has found its way into private hands, and civilian examples can be seen at various air shows around the country.

The winner will be drawn four weeks following publication from correct answers received (on a postcard delivered by U.S. Mail), and will receive a free one-year subscription to **Model Airplane News.** If already a subscriber, the winner will receive a free one-year extension of his subscription.

BELLANCA P-200-A

(Continued from page 116)

Testor's *brown*-tube cement on the edges, and rub it through. Then I add clear dope to seal and shrink it. (Heat will shrink it further.) Once sealed, it accepts any finish.

BUILDER'S NOTE

Of the 40 "flyable" R/C models in my basement, four are foam, six are covered with MonoKote, one with Fabrikote, and 29 with polyester. Most were assembled before covering. When doped, this flimsy polyester becomes shatterproof, *waterproof* and practically bulletproof. It stays tight in all seasons, and repairs are invisible. It also strips off easily and leaves a clean framework.

Assembly before covering is harder to justify, but it does result in permanent joints and long life—and it's a lot easier to install and test a radio in an uncovered frame.

FINISHING

Use CA to attach the vertical interplane struts from the float keels to the wing-rib sides. Paint the bottom of the left wing, and apply the red registration markings (NC 785W). Build, cover and install the outer wing struts. Add stab and float struts, and strut/keel fairings. Inlay the fuselage top with 1/16-inch balsa sheet, and add a 1/8-inch sheet-balsa hatch cover with fore/aft stiffeners. A rubber band hooked to its bottom will hold the hatch cover down.

Fair the wings' leading edges into the fuselage top with scrap balsa. Finish covering the model, including all exposed balsa. Apply enough coats of clear dope to seal all surfaces, and apply aluminum dope over all. Install the clear-plastic side windows, applying CA sparingly. Bend the windshield and install it in the same way, but edge it with red 1/4-inch striping tape.

Give your Airbus a red nose, rubrail and leading-edge stripes, and put red registration numbers on both sides of the rudder, on top of the starboard wing and on the bottom of the port wing. Film-covered models will balance at the front wing spar. To achieve the proper CG with a heavier fabric covering, put 2 ounces of lead into the nose of each float. Then add the black nose-bumpers.

To simulate a 1-inch-scale Wright Cyclone in a 4 1/2-inch anti-drag cowling, build a tight, but removable, sheet-balsa box around the mounted engine from the firewall to 3/8 inch from the prop. (Include a cooling "wind tunnel.") Add a plywood ring around the front of the crank, and a ply former at the firewall. Fill between them with soft-balsa blocks, and carve the tapered nose/crankcase.

Using CA, attach nine, balsa, cylinder silhouettes to the crankcase, 1/3 of the depth of the back from the leading edge. To support them, add T-shaped balsa cowl supports that extend to the rear of the cowl ring. I carved the ring's i.d. from a balsa block, covered it with polyester, and soaked it with CA before I carved the o.d. (This balsa ring holds paint better than the one I cut from a pop bottle, and it looks similar.)

The front exhaust manifold, which is made of scrap and painted aluminum, disguises the flat-black, silhouette engine. It meets the real O.S. 20 4-stroke exhaust in an extension pipe (made from a TV antenna) right behind the ring, and there's no loss of power.

FLYING

Arrange for a standby retriever for your first flights (all flights, if you can!). Even with a tight cowl, dummy engine, restricted exhaust and a three-blade 8x6 to turn, the amazing O.S. 20FS can plane the Airbus off flat water. Acceleration, however, is much better with a nylon 9x4 Top Flite prop. The plane jumps into the air without giving you a chance to show off your floatplane technique!

When getting on step, the semi-scale vee-bottom floats throw more spray than the flat-bottoms I used on my 80-inch version, but they handle rough water beautifully. You can minimize spray by slowly advancing the throttle while holding full up-elevator. When the plane breaks free and is sizzling along on the step, you can return the elevators to neutral.

The Airbus needs the added fin area of the vertical fin plates. The full-scale ship flew without them, but G.M. Bellanca put them on all his subsequent seaplanes, and many of his land planes, too. With the plates, the Airbus flies right. On touchdown, the plane stays on the water and doesn't bounce, so landings are smooth. The twin water rudders let you taxi with good control—even at low throttle in light air. The inverted engine starts and runs well, and no water gets in. The carburetor, fuel line and glow plug (and spills!) are in the open, under the plane.

If you're a "builder," you'll fall in love with the Bellanca P-200-A; if you're into

(Continued on page 120)

BELLANCA P-200-A

(Continued from page 119)

scale, you'll get engaged; and if you prefer to fly off water, you're about to become happily married!

**Here are the addresses of the companies mentioned in this article:*
O.S. Engines/Great Planes Model Distributors, *P.O. Box 4021, Champaign, IL 61820.*
Testor Corp., *620 Buckbee St., Rockford, IL 61101.* ■

HELI VECTOR

(Continued from page 83)

cated cyclic- and collective-pitch-control movements still found in almost all contemporary helicopters.

FIXED BLADES; CONSTANT PITCH

The Heli-Vector rotor blades were thus fixed in a position with a constant pitch of 5 degrees. The airfoil section consisted of a NACA .0018 at the root tapering down to .0009 at the tip. The chord also tapered from 8 inches at the root to 4 inches at the tip. The rotor blades were made of mahogany strips and balsa wood laminated together longitudinally and covered with fiberglass fabric. For mass balance, small lead pellets were inserted into the leading edges. The rotor disc's diameter was 15 feet, and the normal operating speed was 550rpm, with a 20-percent increase allowable for brief periods.

The prototype was powered by a very small two-cylinder, 2-stroke, liquid-cooled outboard engine made by the Kiekhaefer-Mercury Co. It was designated Mk 20, and that number also indicated its conservatively rated horsepower. In this application, however, the power output was probably increased considerably by revving the engine. Later production versions carried a more powerful 4-cylinder Mercury Mk 55 engine that more than doubled the original horsepower rating.

A large, ratio-reduction gear assembly drove twin vee-belts that were coupled to planetary gears that were used to reverse the direction of rotation of one set of rotor blades. The transmission system also had a stable automatic-torque balancing unit and included an autorotation cam clutch. Another interesting feature of this design was the provision for attaching a cargo lifting line through the hollow rotor shaft. This provided automatic balance and trim and didn't couple the inertia of the cargo in roll and pitch.

A hand-operated twist-grip on the handlebars controlled the throttle, and a clutch lever operated the control pulleys, which engaged the rotor drive system. The only instruments on the handlebars were a tachometer that read up to 6500rpm and a fuel gauge. Turning the handlebars varied the torque distribution between the two sets of rotors, and this, in effect, provided azimuth control for the chassis platform upon which the engine was mounted.

HELI AMPHIBIAN

The little Heli-Vector was truly amphibious in that it was mounted on a large rubber "doughnut" that had four inflatable compartments. The four outrigger rubber rolls also were divided into compartments to prevent a total collapse in the event of a puncture.

The prototype first flew on November 2, 1954, reaching a height of 15 feet while

tethered to the ground with a steel cable. The first free flight was made on January 22 of the following year, and more than 200 free flights were subsequently made by qualified helicopter and fixed-wing pilots as well as by untrained people. Each reported that the craft was exceptionally stable and that they were able to make pattern turns almost immediately without difficulty.

Owing to the Heli-Vector's excellent inherent stability, the use of remote-control, dead-weight shifting mechanisms enabled it to perform lifting tasks and free flights without an on-board operator. This stability can't be obtained by using very highly loaded rotors of the ducted type. When tilted, a ducted rotor has characteristics that encourage it to keep on tilting, regardless of the position of the center of gravity.

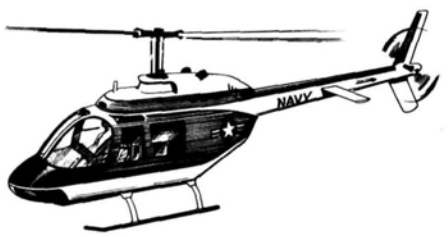
Contributing to the Heli-Vector's stability, its CG was above the hub assembly, roughly at a point coinciding with the pilot's waist. Another factor that contributed to its success was the absence of flapping rotor hinges. With "elastically flexible" (shock-absorbent) blade tips, the usual rolling forces in the horizontal movement of any helicopter were cancelled. This unique application was one of the claims granted by the U.S. Patent Office.

A GOOD DEAL

Without the costly, complicated, cyclic- and collective-pitch-control mechanisms, the Heli-Vector was one of the simplest and least expensive rotary-wing aircraft to achieve controlled flight. The U.S. Army bought 12 for evaluation.

Because of its remarkable stability and parts economy, the Heli-Vector's design should be a worthwhile challenge to those model builders who presently have only the complicated, conventional, main- and tail-rotor configuration available to them. Certainly, the assets of such a stable machine make it much easier to learn to fly R/C miniature rotary-wing aircraft.

(Author's note: I am indebted to Chris Kopp—Heli-Vector flight-demonstration pilot—for much help with technical and historical data.) ■



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